WiNG 5.8.4

Wireless Controller, Service Platform, and Access Point

CLI Reference Guide

MN-002845-01
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<tr>
<td>B.3.12</td>
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</table>

C.1 Support Center | C-1
This manual supports the following wireless controllers, service platforms, and access points:

- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**NOTE:** ES6510 is an *Ethernet Switch* managed by a wireless controller or service platform, such as RFS4000, RFS6000, RFS7000, NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, and NX9600. ES6510 does not have radios and does not provide WLAN support.

**NOTE:** In this guide,
- AP7131, AP7161, and AP7181 are collectively represented as AP71XX.
- AP8122, AP8132, and AP8163 are collectively represented as AP81XX. AP8163 is an outdoor mesh supporting access point.
- AP8222 and AP8232 are collectively represented as AP82XX.
- NX4500 and NX4524 are collectively represented as NX45XX.
- NX6500 and NX6524 are collectively represented as NX65XX.
- NX7510, NX7520, and NX7530 are collectively represented as NX7500 series.
- NX9000, NX9500, and NX9510 are collectively represented as NX9000 series.

A simplified version of the WiNG operating system *user interface* (UI) is available on the following access point and service platform models with the E-SKU:
- AP6511, AP6521, AP6522, AP6562, AP7502, AP7522, AP7532, and AP7562
- NX7510
This new UI, referred to as the WiNG Express (WE) UI, simplifies configuration and monitoring of small access point deployments by limiting monitoring, analytics, and configuration capabilities. The WE UI is designed for single-site access point deployments not exceeding more than 24 access points of the same model.

---

**CAUTION:** If using the WiNG Express (WE) UI, to configure a WE access point, use the WE UI exclusively. Do not use the command line interface (CLI) along with it. Similarly, when using the CLI to configure the WE access point, do not use the WE UI along with it.

---

This section is organized into the following topics:

- *Document Conventions*
- *Notational Conventions*
- *End-User Software License Agreement*
Document Conventions

The following conventions are used in this document to draw your attention to important information:

- **NOTE**: Indicates tips or special requirements.

- **CAUTION**: Indicates conditions that can cause equipment damage or data loss.

- **WARNING!**: Indicates a condition or procedure that could result in personal injury or equipment damage.

- **Switch Note**: Indicates caveats unique to a RFS4000, RFS6000, RFS7000, NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, or NX9600 model controller.
Notational Conventions

The following notational conventions are used in this document:

- Italics are used to highlight specific items in the general text, and to identify chapters and sections in this and related documents
- Bullets (•) indicate:
  - lists of alternatives
  - lists of required steps that are not necessarily sequential
  - action items
- Sequential lists (those describing step-by-step procedures) appear as numbered lists

Understanding Command Syntax

| `<variable>` | Variables are described with a short description enclosed within a '<' and a '>' pair. For example, the command, `rfs7000-37FABE>show interface ge 1` is documented as: `show interface ge <1-4>` where:
| `|` | • show – is the command – displays information
| `|` | • interface – is the keyword – represents the interface type
| `|` | • `<1-4>` – is the variable – represents the ge interface index value
| `|` | The pipe symbol. This is used to separate the variables/keywords in a list. For example, the command, `rfs7000-37FABE> show ......` is documented as: `show [adoption|bonjour|boot] ......` where:
| `|` | • show – is the command – displays information
| `|` | • `[adoption|bonjour|......]` – indicates the different keywords that can be combined with the show command. However, only one of the above option can be used at a time.
| `|` | show adoption ...
| `|` | show bonjour ...
| `|` | show boot ....
<p>|
|</p>
<table>
<thead>
<tr>
<th>Keywords and Variables</th>
<th>Description</th>
</tr>
</thead>
</table>
| Of the different keywords and variables listed inside a ‘[ & ]’ pair, only one can be used. Each choice in the list is separated with a ‘|’ (pipe) symbol. | For example, the command, 
\[ \text{rfs7000-37FABE}\#\text{clear ...} \] is documented as: 
\[ \text{clear [arp-cache|bonjour|cdp|counters|crypto|event-history|firewall|gre|ip|ipv6|l2tpv3-stats|license|lldp|logging|mac-address-table|mint|role|rtls|spanning-tree|traffic-shape|vrrp]} \] where: 
• clear – is the command 
• [arp-cache|cdp|event-history|firewall|gre|ip|ipv6|l2tpv3-stats|license|lldp|logging|mac-address-table|mint|role|rtls|spanning-tree|traffic-shape|vrrp] – indicates that these keywords are available for this command. However, only one can be used at a time. |
| Any command/keyword/variable or a combination of them inside a ‘{ & }’ pair is optional. All optional commands follow the same conventions as listed above. However, they are displayed italicized. | For example, the command, 
\[ \text{rfs7000-37FABE}>\text{show adoption ...} \] is documented as: 
\[ \text{show adoption info } \{ \text{on } <\text{DEVICE-NAME}> \} \] here: 
• show adoption info – is the command. This command can also be used as: 
\[ \text{show adoption info} \] The command can also be extended as: 
\[ \text{show adoption info } \{ \text{on } <\text{DEVICE-NAME}> \} \] here: 
• \{on <DEVICE-NAME>\} – is the keyword, which is optional. |
| The first word is always a command. Keywords are words that must be entered as is. Commands and keywords are mandatory. | For example, the command, 
\[ \text{rfs7000-37FABE}>\text{show wireless} \] is documented as: 
\[ \text{show wireless} \] where: 
• show – is the command 
• wireless – is the keyword |
(Any command/keyword/variable or a combination of them inside a '()' pair are recursive. All recursive commands can be listed in any order and can be used once along with the rest of the commands.

For example, the command,

```
crypto pki export request generate-rsa-key test autogen-subject-name ...
```

is documented as:

```
rfs7000-37FABE#crypto pki export request generate-rsa-key test autogen-subject-name ...
```

here:

- crypto pki export request generate-rsa-key <RSA-KEYPAIR-NAME> auto-gen-subject-name – is the command
- <RSA-KEYPAIR-NAME> – is the RSA keypair name (in this example, the keypair name is 'test'), and is a variable
- (<URL>,email <EMAIL>,fqdn <FQDN>,ip-address <IP>) – is the set of recursive parameters (separated by commas) that can be used in any order.
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CHAPTER 1
INTRODUCTION

This chapter describes the commands available within a device’s Command Line Interface (CLI) structure. CLI is available for wireless controllers, access points (APs), and service platforms.

Access the CLI by using:

- A terminal emulation program running on a computer connected to the serial port on the device (access point, wireless controller, and service platform).
- A Telnet session through Secure Shell (SSH) over a network.

**Configuration for connecting to a Controller using a terminal emulator**

If connecting through the serial port, use the following settings to configure your terminal emulator:

<table>
<thead>
<tr>
<th>Bits Per Second</th>
<th>19200</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Note:</strong> For AP8432, AP8533, AP7502, AP7522, AP7532, AP7562, AP6511, AP6522, AP6532, AP6562 model access points set this value to 115200.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Bits</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parity</td>
<td>None</td>
</tr>
<tr>
<td>Stop Bit</td>
<td>1</td>
</tr>
<tr>
<td>Flow Control</td>
<td>None</td>
</tr>
</tbody>
</table>

When a CLI session is established, complete the following (user input is in **bold**):

```
login as: <username>
administrator’s login password: <password>
```

**User Credentials**

Use the following credentials when logging into a device for the first time:

<table>
<thead>
<tr>
<th>User Name</th>
<th>admin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Password</strong></td>
<td>admin123</td>
</tr>
</tbody>
</table>

When logging into the CLI for the first time, you are prompted to change the password.
Examples in this reference guide
Examples used in this reference guide are generic to each supported wireless controller, service platform, and AP model. Commands that are not common, are identified using the notation “Supported in the following platforms:” For an example, see below:

Supported in the following platforms:
• Wireless Controller – RFS6000

The above example indicates the command is only available for a RFS6000 model wireless controller.

This chapter is organized into the following sections:
• CLI Overview
• Getting Context Sensitive Help
• Using the No Command
• Using CLI Editing Features and Shortcuts
• Using CLI to Create Profiles and Enable Remote Administration

1.1 CLI Overview

INTRODUCTION

The CLI is used for configuring, monitoring, and maintaining the network. The user interface allows you to execute commands on supported wireless controllers, service platforms, and APs, using either a serial console or a remote access method.

This chapter describes basic CLI features. Topics covered include an introduction to command modes, navigation and editing features, help features and command history.

The CLI is segregated into different command modes. Each mode has its own set of commands for configuration, maintenance, and monitoring. The commands available at any given time depend on the mode you are in, and to a lesser extent, the particular model used. Enter a question mark (?) at the system prompt to view a list of commands available for each command mode/instance.

Use specific commands to navigate from one command mode to another. The standard order is: USER EXEC mode, PRIV EXEC mode and GLOBAL CONFIG mode.

![Hierarchy of User Modes](image)
**Command Modes**

A session generally begins in the USER EXEC mode (one of the two access levels of the EXEC mode). For security, only a limited subset of EXEC commands are available in the USER EXEC mode. This level is reserved for tasks that do not change the device’s (wireless controller, service platform, or AP) configuration.

```
rfs7000-37FABE>
```

The system prompt signifies the device name and the last three bytes of the device MAC address.

To access commands, enter the PRIV EXEC mode (the second access level for the EXEC mode). Once in the PRIV EXEC mode, enter any EXEC command. The PRIV EXEC mode is a superset of the USER EXEC mode.

```
rfs7000-37FABE>enable
rfs7000-37FABE#
```

Most of the USER EXEC mode commands are one-time commands and are not saved across device reboots. Save the command by executing 'commit' command. For example, the show command displays the current configuration and the clear command clears the interface.

Access the GLOBAL CONFIG mode from the PRIV EXEC mode. In the GLOBAL CONFIG mode, enter commands that set general system characteristics. Configuration modes, allow you to change the running configuration. If you save the configuration later, these commands are stored across device reboots.

Access a variety of protocol specific (or feature-specific) modes from the global configuration mode. The CLI hierarchy requires you to access specific configuration modes only through the global configuration mode.

```
rfs7000-37FABE#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
rfs7000-37FABE(config)#
```

You can also access sub-modes from the global configuration mode. Configuration sub-modes define specific features within the context of a configuration mode.

```
rfs7000-37FABE(config)#aaa-policy test
rfs7000-37FABE(config-aaa-policy-test)#
```

The following table summarizes available CLI commands:

<table>
<thead>
<tr>
<th>User Exec Mode</th>
<th>Priv Exec Mode</th>
<th>Global Configuration Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal-page-upload</td>
<td>archive</td>
<td>aaa-policy</td>
</tr>
<tr>
<td>change-passwd</td>
<td>boot</td>
<td>aaa-tacacs-policy</td>
</tr>
<tr>
<td>clear</td>
<td>captive-portal-page-upload</td>
<td>alias</td>
</tr>
<tr>
<td>clock</td>
<td>cd</td>
<td>ap621</td>
</tr>
<tr>
<td>cluster</td>
<td>change-passwd</td>
<td>ap622</td>
</tr>
<tr>
<td>commit</td>
<td>clear</td>
<td>ap650</td>
</tr>
<tr>
<td>connect</td>
<td>clock</td>
<td>ap6511</td>
</tr>
<tr>
<td>create-cluster</td>
<td>cluster</td>
<td>ap6521</td>
</tr>
<tr>
<td>crypto</td>
<td>commit</td>
<td>ap6522</td>
</tr>
<tr>
<td>crypto-cmp-cert-update</td>
<td>configure</td>
<td>ap6532</td>
</tr>
<tr>
<td>database</td>
<td>connect</td>
<td>ap6562</td>
</tr>
<tr>
<td>database-backup</td>
<td>copy</td>
<td>ap71XX</td>
</tr>
<tr>
<td>database-restore</td>
<td>cpe (RFS4000, RFS6000, RFS7000,</td>
<td>ap7502</td>
</tr>
<tr>
<td></td>
<td>NX45XX, NX65XX, NX9000, NX95XX,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NX9600)</td>
<td></td>
</tr>
</tbody>
</table>
### Table 1.1 Controller CLI Modes and Commands

<table>
<thead>
<tr>
<th>User Exec Mode</th>
<th>Priv Exec Mode</th>
<th>Global Configuration Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>debug</td>
<td>create-cluster</td>
<td>ap7522</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>crypto</td>
<td>ap7532</td>
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<tr>
<td>disable</td>
<td>crypto-cmp-cert-update</td>
<td>ap7562</td>
</tr>
<tr>
<td>enable</td>
<td>database</td>
<td>ap81xx</td>
</tr>
<tr>
<td>file-sync</td>
<td>database-backup</td>
<td>ap82xx</td>
</tr>
<tr>
<td>help</td>
<td>database-restore</td>
<td>ap8432</td>
</tr>
<tr>
<td>join-cluster</td>
<td>debug</td>
<td>ap8533</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>delete</td>
<td>application</td>
</tr>
<tr>
<td>logging</td>
<td>device-upgrade</td>
<td>application-policy</td>
</tr>
<tr>
<td>mint</td>
<td>diff</td>
<td>association-acl-policy</td>
</tr>
<tr>
<td>no</td>
<td>dir</td>
<td>auto-provisioning-policy</td>
</tr>
<tr>
<td>on</td>
<td>disable</td>
<td>bgp</td>
</tr>
<tr>
<td>opendns</td>
<td>edit</td>
<td>bonjour-gw-discovery-policy</td>
</tr>
<tr>
<td>page</td>
<td>enable</td>
<td>bonjour-gw-forwarding-policy</td>
</tr>
<tr>
<td>ping</td>
<td>erase</td>
<td>bonjour-gw-query-forwarding-policy</td>
</tr>
<tr>
<td>ping6</td>
<td>ex3500</td>
<td>captive-portal</td>
</tr>
<tr>
<td>revert</td>
<td>factory-reset</td>
<td>clear</td>
</tr>
<tr>
<td>service</td>
<td>file-sync</td>
<td>client-identity</td>
</tr>
<tr>
<td>show</td>
<td>halt</td>
<td>client-identity-group</td>
</tr>
<tr>
<td>smart-cache (NX45XX, NX65XX, NX9000, NX95XX, and NX9600)</td>
<td>help</td>
<td>clone</td>
</tr>
<tr>
<td>ssh</td>
<td>join-cluster</td>
<td>crypto-cmp-policy</td>
</tr>
<tr>
<td>telnet</td>
<td>l2tpv3</td>
<td>customize</td>
</tr>
<tr>
<td>terminal</td>
<td>logging</td>
<td>database-client-policy (supported only on VX9000)</td>
</tr>
<tr>
<td>time-it</td>
<td>mint</td>
<td>database-policy</td>
</tr>
<tr>
<td>traceroute</td>
<td>mkmdir</td>
<td>device</td>
</tr>
<tr>
<td>traceroute6</td>
<td>more</td>
<td>device-categorization</td>
</tr>
<tr>
<td>virtual-machine (NX45XX, NX65XX, NX9000, NX95XX, and NX9600)</td>
<td>no</td>
<td>dhcp-server-policy</td>
</tr>
<tr>
<td>watch</td>
<td>on</td>
<td>dhcp6-server-policy</td>
</tr>
</tbody>
</table>
Table 1.1 Controller CLI Modes and Commands

<table>
<thead>
<tr>
<th>User Exec Mode</th>
<th>Priv Exec Mode</th>
<th>Global Configuration Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>write</td>
<td>opendns</td>
<td>dns-whitelist</td>
</tr>
<tr>
<td>clrscr</td>
<td>page</td>
<td>event-system-policy</td>
</tr>
<tr>
<td>exit</td>
<td>ping</td>
<td>ex3500</td>
</tr>
<tr>
<td></td>
<td>ping6</td>
<td>ex3500-management-policy</td>
</tr>
<tr>
<td></td>
<td>pwd</td>
<td>ex3500-qos-class-map-policy</td>
</tr>
<tr>
<td></td>
<td>raid (NX9500, NX7530)</td>
<td>ex3500-qos-policy-map</td>
</tr>
<tr>
<td></td>
<td>re-elect</td>
<td>ex3524</td>
</tr>
<tr>
<td></td>
<td>reload</td>
<td>ex3548</td>
</tr>
<tr>
<td></td>
<td>remote-debug</td>
<td>firewall-policy</td>
</tr>
<tr>
<td></td>
<td>rename</td>
<td>global-association-list</td>
</tr>
<tr>
<td></td>
<td>revert</td>
<td>guest-management</td>
</tr>
<tr>
<td></td>
<td>rmdir</td>
<td>help</td>
</tr>
<tr>
<td></td>
<td>self</td>
<td>host</td>
</tr>
<tr>
<td></td>
<td>service</td>
<td>igmp-snoop-policy (This command has been deprecated. IGMP snooping is now configurable under the profile/device configuration mode. For more information, see <em>ip</em>.)</td>
</tr>
<tr>
<td></td>
<td>show</td>
<td>inline-password-encryption</td>
</tr>
<tr>
<td></td>
<td>smart-cache (NX45XX, NX65XX, NX9000, NX95XX, NX9600)</td>
<td><em>ip</em></td>
</tr>
<tr>
<td></td>
<td>ssh</td>
<td>ipv6</td>
</tr>
<tr>
<td></td>
<td>t5 (RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, NX9000, NX95XX, NX9600)</td>
<td>ipv6-router-advertisement-policy</td>
</tr>
<tr>
<td></td>
<td>telnet</td>
<td>l2tpv3</td>
</tr>
<tr>
<td></td>
<td>terminal</td>
<td>mac</td>
</tr>
<tr>
<td></td>
<td>time-it</td>
<td>management-policy</td>
</tr>
<tr>
<td></td>
<td>traceroute</td>
<td>meshpoint</td>
</tr>
<tr>
<td></td>
<td>traceroute6</td>
<td>meshpoint-qos-policy</td>
</tr>
<tr>
<td></td>
<td>upgrade</td>
<td>mint-policy</td>
</tr>
<tr>
<td></td>
<td>upgrade-abort</td>
<td>nac-list</td>
</tr>
<tr>
<td></td>
<td>virtual-machine (NX45XX, NX65XX, NX9000, NX95XX, NX9600)</td>
<td>no</td>
</tr>
</tbody>
</table>
### Table 1.1 Controller CLI Modes and Commands

<table>
<thead>
<tr>
<th>User Exec Mode</th>
<th>Priv Exec Mode</th>
<th>Global Configuration Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>watch</td>
<td>nsight-policy</td>
<td></td>
</tr>
<tr>
<td>write</td>
<td>nx45xx (NX45XX, NX9000, NX95XX, NX9600)</td>
<td></td>
</tr>
<tr>
<td>clrscr</td>
<td>nx5500 (NX95XX, NX9000, NX95XX, NX9600)</td>
<td></td>
</tr>
<tr>
<td>exit</td>
<td>nx65xx (NX65XX, NX9000, NX95XX, NX9600)</td>
<td>nx75xx (NX9000, NX95XX, NX9600)</td>
</tr>
<tr>
<td></td>
<td>nx9000 (NX9000, NX95XX, NX9600)</td>
<td>nx9000 (NX9000, NX95XX, NX9600)</td>
</tr>
<tr>
<td></td>
<td>nx9600 (NX9600)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>passphrase-policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>password-encryption</td>
<td></td>
</tr>
<tr>
<td></td>
<td>profile</td>
<td></td>
</tr>
<tr>
<td></td>
<td>radio-qos-policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>radius-group</td>
<td></td>
</tr>
<tr>
<td></td>
<td>radius-server-policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>radius-user-pool-policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rename</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rf-domain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rfs4000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rfs6000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rfs7000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>roaming-assist-policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>role-policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>route-map</td>
<td></td>
</tr>
<tr>
<td></td>
<td>routing-policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rtl-server-policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>schedule-policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>self</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sensor-policy</td>
<td></td>
</tr>
</tbody>
</table>
### Table 1.1 Controller CLI Modes and Commands

<table>
<thead>
<tr>
<th>User Exec Mode</th>
<th>Priv Exec Mode</th>
<th>Global Configuration Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>smart-cache-policy (NX45XX, NX65XX, NX9000, NX9500, and NX9600)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>smart-rf-policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t5 (RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, NX9000, NX95XX, and NX9600)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>url-filter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>url-list (NX45XX, NX65XX, and NX9000, NX95XX, and NX9600)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>vx9000 (NX9000, NX95XX, and NX9600)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>web-filter-policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>wips-policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>wlan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>wlan-qos-policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>write</td>
</tr>
<tr>
<td></td>
<td></td>
<td>clrscr</td>
</tr>
<tr>
<td></td>
<td></td>
<td>commit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>do</td>
</tr>
<tr>
<td></td>
<td></td>
<td>end</td>
</tr>
<tr>
<td></td>
<td></td>
<td>exit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>revert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>service</td>
</tr>
<tr>
<td></td>
<td></td>
<td>show</td>
</tr>
</tbody>
</table>
1.2 Getting Context Sensitive Help

INTRODUCTION

Enter a question mark (?) at the system prompt to display a list of commands available for each mode. Obtain a
list of arguments and keywords for any command using the CLI context-sensitive help.

Use the following commands to obtain help specific to a command mode, command name, keyword or argument:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(prompt)#help</td>
<td>Displays a brief description of the help system</td>
</tr>
<tr>
<td>(prompt)#abbreviated-command-entry?</td>
<td>Lists commands in the current mode that begin with a particular character string</td>
</tr>
<tr>
<td>(prompt)#abbreviated-command-entry[TAB]</td>
<td>Completes a partial command name</td>
</tr>
<tr>
<td>(prompt)#?</td>
<td>Lists all commands available in the command mode</td>
</tr>
<tr>
<td>(prompt)#command ?</td>
<td>Lists the available syntax options (arguments and keywords) for the command</td>
</tr>
<tr>
<td>(prompt)#command keyword ?</td>
<td>Lists the next available syntax option for the command</td>
</tr>
</tbody>
</table>

NOTE: The system prompt varies depending on the configuration mode.

NOTE: Enter Ctrl + V to use ? as a regular character and not as a character used for displaying context sensitive help. This is required when the user has to enter a URL that ends with a ?

NOTE: The escape character used throughout the CLI is “\”. To enter a “\” use “\\” instead.

When using context-sensitive help, the space (or lack of a space) before the question mark (?) is significant. To obtain a list of commands that begin with a particular sequence, enter the characters followed by a question mark (?). Do not include a space. This form of help is called word help, because it completes a word.

rfs7000-37FABE#service?
service Service Commands
rfs7000-37FABE#service
Enter a question mark (?) (in place of a keyword or argument) to list keywords or arguments. Include a space before the “?”. This form of help is called command syntax help. It shows the keywords or arguments available based on the command/keyword and argument already entered.

rfs7000-37FABE#service ?
block-adopter-config-update  Block configuration updates from the adopter
bluetooth                Bluetooth service commands
clear                    Clear adoption history
cli-tables-skin          Choose a formatting layout/skin for CLI tabular outputs
cluster                  Cluster Protocol
copy                     Copy from one file to another
delete                   Delete sessions
delete-offline-aps       Delete Access Points that are configured but offline
force-send-config        Resend configuration to the device
force-update-vm-stats    Force VM statistics to be pushed up to the NOC
load-balancing           Wireless load-balancing service commands
load-ssh-authorized-keys Load Ssh authorized keys
locator                  Enable leds flashing on the device
mint                     MiNT protocol
pktcap                   Start packet capture
pm                       Process Monitor
radio                    Radio parameters
radius                   Radius test
request-full-config-from-adopter Request full configuration from the adopter
set                      Set validation mode
show                     Show running system information
signal                   Send a signal to a process
smart-rf                 Smart-RF Management Commands
snmp                     Snmp
ssm                      Command related to ssm
start-shell              Provide shell access
syslog                   Test the syslog server configuration
trace                    Trace a process for system calls and signals
troubleshoot             Troubleshooting
wireless                 Command related to wireless

rfs7000-37FABE#

It is possible to abbreviate commands and keywords to allow a unique abbreviation. For example, “configure terminal” can be abbreviated as config t. Since the abbreviated command is unique, the controller accepts the abbreviation and executes the command.

Enter the help command (available in any command mode) to provide the following description:

rfs7000-37FABE>help

When using the CLI, help is provided at the command line when typing '?'.

If no help is available, the help content will be empty. Backup until entering a '?' shows the help content.

There are two styles of help provided:
1. Full help. Available when entering a command argument (e.g. 'show ?'). This will describe each possible argument.

2. Partial help. Available when an abbreviated argument is entered. This will display which arguments match the input (e.g. 'show ve?').

rfs7000-37FABE>
1.3 Using the No Command

INTRODUCTION
Almost every command has a no form. Use no to disable a feature or function or return it to its default. Use the command without the no keyword to re-enable a disabled feature.

1.3.1 Basic Conventions
Keep the following conventions in mind while working within the CLI structure:
- Use ? at the end of a command to display available sub-modes. Type the first few characters of the sub-mode and press the tab key to add the sub-mode. Continue using ? until you reach the last sub-mode.
- Pre-defined CLI commands and keywords are case-insensitive: cfg = Cfg = CFG. However (for clarity), CLI commands and keywords are displayed (in this guide) using mixed case. For example, apPolicy, trapHosts, channellInfo.
- Enter commands in uppercase, lowercase, or mixed case. Only passwords are case sensitive.

1.4 Using CLI Editing Features and Shortcuts

INTRODUCTION
A variety of shortcuts and edit features are available. The following sections describe these features:
- Moving the Cursor on the Command Line
- Completing a Partial Command Name
- Command Output Pagination

1.4.1 Moving the Cursor on the Command Line

Using CLI Editing Features and Shortcuts
The following table shows the key combinations or sequences to move the command line cursor. Ctrl defines the control key, which must be pressed simultaneously with its associated letter key. Esc means the escape key (which must be pressed first), followed by its associated letter key. Keys are not case sensitive. Specific letters are used to provide an easy way of remembering their functions.

<table>
<thead>
<tr>
<th>Keystrokes</th>
<th>Function Summary</th>
<th>Function Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Arrow or Ctrl-B</td>
<td>Back character</td>
<td>Moves the cursor one character to the left When entering a command that extends beyond a single line, press the Left Arrow or Ctrl-B keys repeatedly to move back to the system prompt.</td>
</tr>
<tr>
<td>Right Arrow or Ctrl-F</td>
<td>Forward character</td>
<td>Moves the cursor one character to the right</td>
</tr>
<tr>
<td>Esc- B</td>
<td>Back word</td>
<td>Moves the cursor back one word</td>
</tr>
<tr>
<td>Esc- F</td>
<td>Forward word</td>
<td>Moves the cursor forward one word</td>
</tr>
<tr>
<td>Ctrl-A</td>
<td>Beginning of line</td>
<td>Moves the cursor to the beginning of the command line</td>
</tr>
<tr>
<td>Ctrl-E</td>
<td>End of line</td>
<td>Moves the cursor to the end of the command line</td>
</tr>
<tr>
<td>Ctrl-D</td>
<td></td>
<td>Deletes the current character</td>
</tr>
<tr>
<td>Ctrl-U</td>
<td></td>
<td>Deletes text up to cursor</td>
</tr>
</tbody>
</table>
1.4.2 Completing a Partial Command Name

Using CLI Editing Features and Shortcuts

If you cannot remember a command name (or if you want to reduce the amount of typing you have to perform), enter the first few letters of a command, then press the Tab key. The command line parser completes the command if the string entered is unique to the command mode. If your keyboard does not have a Tab key, press Ctrl-L.

The CLI recognizes a command once you have entered enough characters to make the command unique. If you enter "conf" within the privileged EXEC mode, the CLI associates the entry with the configure command, since only the configure command begins with `conf`.

In the following example, the CLI recognizes a unique string in the privileged EXEC mode when the Tab key is pressed:

```
rfs7000-37FABE#conf[TAB]
rfs7000-37FABE#configure
```

When using the command completion feature, the CLI displays the full command name. The command is not executed until the Return or Enter key is pressed. Modify the command if the full command was not what you intended in the abbreviation. If entering a set of characters (indicating more than one command), the system lists all commands beginning with that set of characters.

Enter a question mark (?) to obtain a list of commands beginning with that set of characters. Do not leave a space between the last letter and the question mark (?).

For example, entering U lists all commands available in the current command mode:

```
rfs7000-37FABE#co?
commit     Commit all changes made in this session
configure  Enter configuration mode
connect    Open a console connection to a remote device
copy       Copy from one file to another
rfs7000-37FABE#
```

### Table 1.2 Keystrokes Details

<table>
<thead>
<tr>
<th>Keystrokes</th>
<th>Function Summary</th>
<th>Function Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ctrl-K</td>
<td>Deletes from the cursor to end of the line</td>
<td></td>
</tr>
<tr>
<td>Ctrl-P</td>
<td>Obtains the prior command from memory</td>
<td></td>
</tr>
<tr>
<td>Ctrl-N</td>
<td>Obtains the next command from memory</td>
<td></td>
</tr>
<tr>
<td>Esc-C</td>
<td>Converts the letter at the cursor to uppercase</td>
<td></td>
</tr>
<tr>
<td>Esc-L</td>
<td>Converts the letter at the cursor to lowercase</td>
<td></td>
</tr>
<tr>
<td>Esc-D</td>
<td>Deletes the remainder of a word</td>
<td></td>
</tr>
<tr>
<td>Ctrl-W</td>
<td>Deletes the word up to the cursor</td>
<td></td>
</tr>
<tr>
<td>Ctrl-Z</td>
<td>Returns to the root prompt</td>
<td></td>
</tr>
<tr>
<td>Ctrl-T</td>
<td>Transposes the character to the left of the cursor with the character located at the cursor</td>
<td></td>
</tr>
<tr>
<td>Ctrl-L</td>
<td>Clears the screen</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** The characters entered before the question mark are reprinted to the screen to complete the command entry.
1.4.3 Command Output Pagination

- Using CLI Editing Features and Shortcuts

Output often extends beyond the visible screen length. For cases where output continues beyond the screen, the output is paused and a

--More--

prompt displays at the bottom of the screen. To resume the output, press the Enter key to scroll down one line or press the Spacebar to display the next full screen of output.

1.5 Using CLI to Create Profiles and Enable Remote Administration

- INTRODUCTION

The following sections describe the following essential procedures:

- Creating Profiles
- Changing the default profile by creating vlan 150 and mapping to ge3 Physical interface
- Enabling Remote Administration

1.5.1 Creating Profiles

- Using CLI to Create Profiles and Enable Remote Administration

Profiles are sort of a ‘template’ representation of configuration. The system has:

- a default profile for each of the following devices:
  - RFS4000, RFS6000, RFS7000
- a default profile for each of the following service platforms:
  - NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600
- a default profile for each of the following access points:
  - AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533

To modify the default profile to assign an IP address to the management port:

```
rfs7000-37FABE(config)#profile rfs7000 default-rfs7000
rfs7000-37FABE(config-profile-default-rfs7000)#interface me1
rfs7000-37FABE(config-profile-default-rfs7000-if-me1)#ip address 172.16.10.2/24
rfs7000-37FABE(config-profile-default-rfs7000-if-me1)#commit
rfs7000-37FABE(config-profile-default-rfs7000)#exit
rfs7000-37FABE(config)#
```

The following command displays a default AP71XX profile:

```
rfs7000-37FABE(config)#profile ap71xx default-ap71xx
rfs7000-37FABE(config-profile-default-ap71xx)#show context
```

The following command displays a default AP71XX profile:

```
rfs7000-37FABE(config-profile-default-ap71xx)#show context
```

```
profile ap71xx default-ap71xx
  autoinstall configuration
  autoinstall firmware
  device-upgrade persist-images
  crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ikev2 policy ikev2-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
  crypto ikev1 remote-vpn
  crypto ikev2 remote-vpn
  crypto auto-ipsec-secure
  crypto remote-vpn-client
  interface radio1
```
interface radio2
interface radio3
interface ge1
  ip dhcp trust
  qos trust dscp
  qos trust 802.1p
interface ge2
  ip dhcp trust
  qos trust dscp

1.5.2 Changing the default profile by creating vlan 150 and mapping to ge3

Physical interface

Using CLI to Create Profiles and Enable Remote Administration

Logon to the controller in config mode and follow the procedure below:

rfs7000-37FABE(config-profile-default-rfs7000)#interface vlan 150
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan150)#ip address 192.168.150.20/24
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan150)#exit
rfs7000-37FABE(config-profile-default-rfs7000)#interface ge 3
rfs7000-37FABE(config-profile-default-rfs7000)#interface ge 3
rfs7000-37FABE(config-profile-default-rfs7000-if-ge3)#switchport access vlan 150
rfs7000-37FABE(config-profile-default-rfs7000-if-ge3)#commit write
[OK]

rfs7000-37FABE(config-profile-default-rfs7000-if-ge3)#show interface vlan 150
Interface vlan150 is UP
  Hardware-type: vlan, Mode: Layer 3, Address: 00-15-70-37-FA-BE
  Index: 8, Metric: 1, MTU: 1500
  IP-Address: 192.168.150.20/24
  input packets 43, bytes 12828, dropped 0, multicast packets 0
  input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
  output packets 0, bytes 0, dropped 0
  output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
  collisions 0

1.5.2.1 Viewing Configured APs

To view previously configured APs, enter the following command:

rfs7000-6DCD4B#show wireless ap configured

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap7131-11E6C4</td>
<td>00-23-68-11-E6-C4</td>
<td>default-ap71xx</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap8132-711728</td>
<td>B4-C7-99-71-17-28</td>
<td>default-ap81xx</td>
<td>default</td>
<td>00-15-70-81-74-2D</td>
</tr>
<tr>
<td>3</td>
<td>ap81xx-74B45C</td>
<td>B4-C7-99-74-B4-5C</td>
<td>default-ap81xx</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B#

1.5.3 Enabling Remote Administration

Using CLI to Create Profiles and Enable Remote Administration

A terminal server may function in remote administration mode if either the terminal services role is not installed on the machine or the client used to invoke the session has enabled the admin controller.

- A terminal emulation program running on a computer connected to the serial port on the controller. The serial port is located on the front of the controller.
- A Telnet session through a Secure Shell (SSH) over a network. The Telnet session may or may not use SSH depending on how the controller is configured. It is recommended you use SSH for remote administration tasks.

This section is organized into the following sub sections:

- Configuring Telnet for Management Access
- Configuring SSH
1.5.3.1 Configuring Telnet for Management Access

**Enabling Remote Administration**

Login through the serial console. Perform the following:

1. A session generally begins in the USER EXEC mode (one of the two access levels of the EXEC mode).
2. Access the GLOBAL CONFIG mode from the PRIV EXEC mode.
   ```
   rfs7000-37FABE>en
   rfs7000-37FABE#configure terminal
   Enter configuration commands, one per line. End with CNTL/Z.
   ```
3. Go to 'default-management-policy' mode.
   ```
   rfs7000-37FABE(config)#management-policy ?
   rfs7000-37FABE(config)#management-policy default
   rfs7000-37FABE(config-management-policy-default)#
   ```
4. Enter Telnet and the port number at the command prompt. The port number is optional. The default port is 23. Commit the changes after every command. Telnet is enabled.
   ```
   rfs7000-37FABE(config-management-policy-default)#telnet
   rfs7000-37FABE(config-management-policy-default)#commit write
   ```
5. Connect to the controller through Telnet using its configured IP address. Use the following credentials when logging on to the device for the first time:

<table>
<thead>
<tr>
<th>User Name</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin</td>
<td>admin123</td>
</tr>
</tbody>
</table>

When logging into the controller for the first time, you are prompted to change the password.

To change user credentials:

1. Enter the username, password, role and access details.
   ```
   rfs7000-37FABE(config-management-policy-default)#user testuser password test@123
   role helpdesk access all
   ```
   ```
   rfs7000-37FABE(config-management-policy-default)#commit
   ```
   ```
   rfs7000-37FABE(config-management-policy-default)#show context
   management-policy default
telnet
http server
https server
ssh
user admin password 1
ba7da2bf2f7945af1d3ae1b8b762b541bd5bac1f80a54cd4488f38ed44b91ec
role superuser
access all
user operator password 1
0be97e930d29dcf4733e7c5f74a7be54570c2450e855ce1a696b0558a40410
role monitor access all
user testuser password 1
bca381b5b93cdd0c209e1da8a9d387fa09bfae14cc987438a4d144cb516ffcc
role helpdesk access all
snmp-server community public ro
snmp-server community private rw
snmp-server user snmptrap v3 encrypted des auth md5 0 test@123
snmp-server user snmpoperator v3 encrypted des auth md5 0 operator
snmp-server user snmpmanager v3 encrypted des auth md5 0 test@123
rfs7000-37FABE(config-management-policy-default)#
   ```
2. Logon to the Telnet console and provide the user details configured in the previous step to access the controller.
   ```
   rfs7000 release 5.8.4.0-008D
   rfs7000-37FABE login: testuser
   Password:
   Welcome to CLI
   Starting CLI...
   rfs7000-37FABE>
   ```
1.5.3.2 Configuring SSH

Enabling Remote Administration

By default, SSH is enabled from the factory settings on the controller. The controller requires an IP address and login credentials.

To enable SSH access in the default profile, login through the serial console. Perform the following:

1. Access the GLOBAL CONFIG mode from the PRIV EXEC mode.
   
   rfs7000-37FABE>en
   rfs7000-37FABE#configure

   Enter configuration commands, one per line. End with CNTL/Z.

2. Go to ‘config-management-policy-default’ mode.

   rfs7000-37FABE(config)#management-policy default
   rfs7000-37FABE(config-management-policy-default)#

3. Enter SSH at the command prompt.

   rfs7000-37FABE(config-management-policy-default)#ssh

4. Log into the controller through SSH using appropriate credentials.

5. Use the following credentials when logging on to the device for the first time:

<table>
<thead>
<tr>
<th>User Name</th>
<th>admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password</td>
<td>admin123</td>
</tr>
</tbody>
</table>

When logging into the controller for the first time, you are prompted to change the password.

To change the user credentials:

rfs7000 release 5.8.4.0-008D
rfs7000-37FABE login: testuser
Password:
Welcome to CLI
Starting CLI...
rfs7000-37FABE>
CHAPTER 2
USER EXEC MODE COMMANDS

Logging in to the wireless controller places you within the USER EXEC command mode. Typically, a login requires a user name and password. You have three login attempts before the connection attempt is refused. USER EXEC commands (available at the user level) are a subset of the commands available at the privileged level. In general, USER EXEC commands allow you to connect to remote devices, perform basic tests, and list system information.

To list available USER EXEC commands, use ? at the command prompt. The USER EXEC prompt consists of the device host name followed by an angle bracket (>).

<DEVICE>>?
Command commands:
captive-portal-page-upload Captive portal advanced page upload
change-passwd Change password
clear Clear
clock Configure software system clock
cluster Cluster commands
commit Commit all changes made in this session
connect Open a console connection to a remote device
create-cluster Create a cluster
crypto Encryption related commands
crypto-cmp-cert-update Update the cmp certs
database Database
database-backup Backup database
database-restore Restore database
debug Debugging functions
device-upgrade Device firmware upgrade
disable Turn off privileged mode command
enable Turn on privileged mode command
file-sync File sync between controller and adoptees
help Description of the interactive help system
join-cluster Join the cluster
l2tpv3 L2tpv3 protocol
logging Modify message logging facilities
mint MiNT protocol
no Negate a command or set its defaults
on On RF-Domain
opendns Opendns username/password configuration
page Toggle paging
ping Send ICMP echo messages
ping6 Send ICMPv6 echo messages
revert Revert changes
service Service Commands
show Show running system information
smart-cache Content Cache Operation
ssh Open an ssh connection
telnet Open a telnet connection
terminal Set terminal line parameters
time-it
  Check how long a particular command took between
  request and completion of response
traceroute
  Trace route to destination
traceroute6
  Trace route to destination(IPv6)
virtual-machine
  Virtual Machine
watch
  Repeat the specific CLI command at a periodic
  interval
write
  Write running configuration to memory or
  terminal
clrscr
  Clears the display screen
exit
  Exit from the CLI
<DEVICE>>
# 2.1 User Exec Commands

The following table summarizes the User Exec Mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal-page-upload</td>
<td>Uploads captive portal advanced pages</td>
<td>page 2-5</td>
</tr>
<tr>
<td>change-passwd</td>
<td>Changes the password of a logged user</td>
<td>page 2-8</td>
</tr>
<tr>
<td>clear</td>
<td>Resets the last saved command</td>
<td>page 2-9</td>
</tr>
<tr>
<td>clock</td>
<td>Configures the system clock</td>
<td>page 2-20</td>
</tr>
<tr>
<td>cluster</td>
<td>Accesses the cluster context</td>
<td>page 2-21</td>
</tr>
<tr>
<td>connect</td>
<td>Establishes a console connection to a remote device</td>
<td>page 2-22</td>
</tr>
<tr>
<td>create-cluster</td>
<td>Creates a new cluster on a specified device</td>
<td>page 2-23</td>
</tr>
<tr>
<td>crypto</td>
<td>Enables encryption</td>
<td>page 2-25</td>
</tr>
<tr>
<td>crypto-cmp-cert-update</td>
<td>Triggers a CMP certificate update on a specified device or devices</td>
<td>page 2-34</td>
</tr>
<tr>
<td>database</td>
<td>Enables automatic repairing (vacuuming) and dropping of databases</td>
<td>page 2-35</td>
</tr>
<tr>
<td>database-backup</td>
<td>Backs up captive-portal and/or NSight database to a specified location and file on an FTP or SFTP server</td>
<td>page 2-36</td>
</tr>
<tr>
<td>database-restore</td>
<td>Restores a previously exported database [captive-portal and/or NSight]. Previously exported databases (backed up to a specified FTP or SFTP server) are restored to the original database.</td>
<td>page 2-37</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Configures device firmware upgrade settings</td>
<td>page 2-38</td>
</tr>
<tr>
<td>disable</td>
<td>Turns off (disables) the privileged mode command set</td>
<td>page 2-48</td>
</tr>
<tr>
<td>enable</td>
<td>Turns on (enables) the privileged mode command set</td>
<td>page 2-49</td>
</tr>
<tr>
<td>file-sync</td>
<td>Configures parameters enabling syncing of PKCS#12 certificate between the staging-controller and adoptee AP6522/AP6562 client-bridge access points</td>
<td>page 2-50</td>
</tr>
<tr>
<td>join-cluster</td>
<td>Adds a device (access point, wireless controller, or service platform) to an existing cluster of devices</td>
<td>page 2-53</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>Establishes or brings down Layer 2 Tunneling Protocol Version 3 (L2TPV3) tunnels</td>
<td>page 2-55</td>
</tr>
<tr>
<td>logging</td>
<td>Modifies message logging facilities</td>
<td>page 2-57</td>
</tr>
<tr>
<td>mint</td>
<td>Configures MiNT protocol</td>
<td>page 2-59</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 2-61</td>
</tr>
<tr>
<td>on</td>
<td>Executes the following commands in the RF Domain context: clrscr, do, end, exit, help, service, show</td>
<td>page 2-63</td>
</tr>
</tbody>
</table>
### Table 2.1 User Exec Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>opendns</td>
<td>Connects to the OpenDNS site using OpenDNS registered credentials (username, password) to obtain the device-id. This command is a part of the process integrating access points and controllers with the OpenDNS service.</td>
<td>page 2-64</td>
</tr>
<tr>
<td>page</td>
<td>Toggles a device’s (access point, wireless controller, or service platform) paging function</td>
<td>page 2-66</td>
</tr>
<tr>
<td>ping</td>
<td>Sends ICMP echo messages to a user-specified location</td>
<td>page 2-67</td>
</tr>
<tr>
<td>ping6</td>
<td>Sends ICMPv6 echo messages to a user-specified IPv6 address</td>
<td>page 2-69</td>
</tr>
<tr>
<td>ssh</td>
<td>Opens an SSH connection between two network devices</td>
<td>page 2-70</td>
</tr>
<tr>
<td>telnet</td>
<td>Opens a Telnet session</td>
<td>page 2-71</td>
</tr>
<tr>
<td>terminal</td>
<td>Sets the length and width of the terminal window</td>
<td>page 2-72</td>
</tr>
<tr>
<td>time-it</td>
<td>Verifies the time taken by a particular command between request and response</td>
<td>page 2-73</td>
</tr>
<tr>
<td>traceroute</td>
<td>Traces the route to its defined destination</td>
<td>page 2-74</td>
</tr>
<tr>
<td>traceroute6</td>
<td>Traces the route to a specified IPv6 destination</td>
<td>page 2-75</td>
</tr>
<tr>
<td>watch</td>
<td>Repeats a specific CLI command at a periodic interval</td>
<td>page 2-76</td>
</tr>
<tr>
<td>smart-cache</td>
<td>Pre-fetches content cache from the specified list of URLs. This command is specific to the NX45XX, NX65XX, NX9XXX series service platforms.</td>
<td>page 2-78</td>
</tr>
<tr>
<td>virtual-machine</td>
<td>Installs, configures, and monitors the status of virtual machines (VMs). This command is specific to the NX45XX, NX65XX, NX9XXX series service platforms.</td>
<td>page 2-79</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see *Chapter 5, COMMON COMMANDS.*

**NOTE:** The input parameter `<HOSTNAME>`, if used in syntaxes across this chapter, cannot include an underscore (_) character.
### 2.1.1 captive-portal-page-upload

**User Exec Commands**

Uploads captive portal advanced pages to connected access points. Use this command to provide connected access points with specific captive portal configurations so that they can successfully provision login, welcome, and condition pages to requesting clients attempting to access the wireless network using the captive portal.

**Supported in the following platforms:**
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

- captive-portal-page-upload <CAPTIVE-PORTAL-NAME> [<MAC/HOSTNAME>|all]
  
- captive-portal-page-upload <CAPTIVE-PORTAL-NAME> <FILE-NAME>

**Parameters**

- captive-portal-page-upload <CAPTIVE-PORTAL-NAME> [<MAC/HOSTNAME]|all]
  - captive-portal-page-upload <CAPTIVE-PORTAL-NAME> [all|rf-domain]
  - captive-portal-page-upload <CAPTIVE-PORTAL-NAME> [all]
  - captive-portal-page-upload <CAPTIVE-PORTAL-NAME> rf-domain [all]
  - captive-portal-page-upload <CAPTIVE-PORTAL-NAME> rf-domain [rf-domain]
  - captive-portal-page-upload cancel-upload [all|on rf-domain]
  - captive-portal-page-upload delete-file <CAPTIVE-PORTAL-NAME> <FILE-NAME>
  - captive-portal-page-upload load-file <CAPTIVE-PORTAL-NAME> <FILE-NAME>

- captive-portal-page-upload <CAPTIVE-PORTAL-NAME> [all|rf-domain]
  - captive-portal-page-upload load-file <CAPTIVE-PORTAL-NAME> <URL>

**Uploads advanced pages of the captive-portal identified by the <CAPTIVE-PORTAL-NAME> parameter**

- **<CAPTIVE-PORTAL-NAME>** – Specify the captive portal’s name (should be existing and configured).
- **<MAC/HOSTNAME>** – Uploads to a specified AP
- **all** – Uploads to all APs
- **upload-time <TIME>** – Optional. Schedules an AP upload time
- **<TIME>** – Specify upload time in the MM/DD/YYYY-HH:MM or HH:MM format.

**Note:** The scheduled upload time is your local system’s time. It is not the access point, controller, service platform, or virtual controller time and it is not synched with the device.

**Note:** To view a list of uploaded captive portal files, execute the `show > captive-portal-page-upload > list-files <CAPTIVE-PORTAL-NAME>` command.

---

**NOTE:** Ensure that the captive portal pages uploaded are *.tar files.
**captive-portal-page-upload** `<CAPTIVE-PORTAL-NAME>` rf-domain `[<DOMAIN-NAME>|all] {from-controller} {(upload-time <TIME>)}

<table>
<thead>
<tr>
<th>captive-portal-page-upload</th>
<th>Uploads advanced pages of the captive portal identified by the <code>&lt;CAPTIVE-PORTAL-NAME&gt;</code> parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;CAPTIVE-PORTAL-NAME&gt;</code></td>
<td>- <code>&lt;CAPTIVE-PORTAL-NAME&gt;</code> – Specify captive portal’s name (should be existing and configured).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>rf-domain</th>
<th>Uploads to all APs within a specified RF Domain or all RF Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>`[&lt;DOMAIN-NAME&gt;</td>
<td>all]`</td>
</tr>
<tr>
<td></td>
<td>- all – Uploads to APs across all RF Domains</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>from-controller</th>
<th>Optional. Uploads to APs from the adopted device</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>upload-time &lt;TIME&gt;</th>
<th>Optional. Schedules an AP upload time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- <code>&lt;TIME&gt;</code> – Specify upload time in the MM/DD/YYYY-HH:MM or HH:MM format.</td>
</tr>
</tbody>
</table>

**Note:** The scheduled upload time is your local system’s time. It is not the access point, controller, service platform, or virtual controller time and it is not synched with the device.

**captive-portal-page-upload cancel-upload** `[<MAC/HOSTNAME>|all|on rf-domain [<DOMAIN-NAME>|all]]`

<table>
<thead>
<tr>
<th>captive-portal-page-upload cancel-upload</th>
<th>Cancels a scheduled AP upload</th>
</tr>
</thead>
</table>

| cancel-upload                            | Select one of the following options: |
| `<MAC/HOSTNAME>|all|on rf-domain [<DOMAIN-NAME>|all]]` | - `<MAC/HOSTNAME>` – Cancels scheduled upload to a specified AP. Specify the AP’s MAC address or hostname. |
|                                        | - all – Cancels all scheduled AP uploads |
|                                        | - on rf-domain – Cancels all scheduled uploads within a specified RF Domain or all RF Domains |
|                                        |   - `<DOMAIN-NAME>` – Cancels scheduled uploads within a specified RF Domain. Specify RF Domain name. |
|                                        |   - all – Cancels scheduled uploads across all RF Domains |

**captive-portal-page-upload delete-file** `<CAPTIVE-PORTAL-NAME> <FILE-NAME>`

<table>
<thead>
<tr>
<th>captive-portal-page-upload delete-file</th>
<th>Deletes a specified captive portal’s uploaded captive-portal internal page files</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><code>&lt;CAPTIVE-PORTAL-NAME&gt; &lt;FILE-NAME&gt;</code></th>
<th>Deletes a captive portal’s, identified by the <code>&lt;CAPTIVE-PORTAL-NAME&gt;</code> keyword, uploaded internal page files</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- <code>&lt;CAPTIVE-PORTAL-NAME&gt;</code> – Specify the captive portal’s name.</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;FILE-NAME&gt;</code> – Specify the file name. The specified internal captive portal page is deleted.</td>
</tr>
</tbody>
</table>

**captive-portal-page-upload load-file** `<CAPTIVE-PORTAL-NAME> <URL>`

<table>
<thead>
<tr>
<th>captive-portal-page-upload load-file</th>
<th>Loads captive-portal advanced pages</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><code>&lt;CAPTIVE-PORTAL-NAME&gt; &lt;URL&gt;</code></th>
<th>Specify the captive portal’s name and location. The captive portal should be existing and configured.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- <code>&lt;URL&gt;</code> – Specifies location of the captive-portal’s advanced pages. Use one of the following formats to specify the location:</td>
</tr>
<tr>
<td></td>
<td>Contd..</td>
</tr>
</tbody>
</table>
**Examples**

```bash
ap6562-B1A214> captive-portal-page-upload load-file captive_portal_test tftp://89.89.89.17/pages_new_only.tar
```

```bash
ap6562-B1A214> show captive-portal-page-upload load-image-status
Download of captive_portal_test advanced page file is complete
```

```bash
ap6562-B1A214> captive-portal-page-upload captive_portal_test all
--------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-0A-81-B1-A2-14</td>
<td>Success</td>
<td>Added 6 APs to upload queue</td>
</tr>
</tbody>
</table>
--------------------------------------------------------------------------------
```

```bash
ap6562-B1A214> show captive-portal-page-upload status
Number of APs currently being uploaded : 1
Number of APs waiting in queue to be uploaded : 0
--------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>AP</th>
<th>STATE</th>
<th>UPLOAD TIME</th>
<th>PROGRESS</th>
<th>RETRIES</th>
<th>LAST UPLOAD ERROR</th>
<th>Uploaded BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap6562-B1A738</td>
<td>downloading</td>
<td>immediate</td>
<td>100</td>
<td>0</td>
<td>-</td>
<td>None</td>
</tr>
</tbody>
</table>
```

**IPv4 URLs:**
- `tftp://<hostname|IP>[:port]/path/file`
- `ftp://<user>:@<hostname|IP>[:port]/path/file`
- `sftp://<user>:<passwd>@<hostname|IP>[:port]/path/file`
- `http://<hostname|IP>[:port]/path/file`
- `cf:/path/file`
- `usb<n>:/path/file`

**IPv6 URLs:**
- `tftp://<hostname|[IPv6]>[:port]/path/file`
- `sftp://<user>:<passwd>@<hostname|[IPv6]>[:port]/path/file`

**Note:** The captive portal pages are downloaded to the controller from the location specified here. After downloading use the `captive-portal-page-upload > CAPTIVE-PORTAL-NAME > DEVICE-OR-DOMAIN-NAME` command to upload these pages to APs.
2.1.2 change-passwd

User Exec Commands

Changes the password of a logged user. When this command is executed without any parameters, the password can be changed interactively.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

change-passwd {<OLD-PASSWORD>} <NEW-PASSWORD>

Parameters

- change-passwd {<OLD-PASSWORD>} <NEW-PASSWORD>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;OLD-PASSWORD&gt;</td>
<td>Optional. Specify the password to be changed.</td>
</tr>
<tr>
<td>&lt;NEW-PASSWORD&gt;</td>
<td>Specify the new password.</td>
</tr>
</tbody>
</table>

Note: The password can also be changed interactively. To do so, press [Enter] after the command.

Usage Guidelines

A password must be from 1 - 64 characters.

Examples

rfs7000-37FABE>change-passwd
Enter old password:
Enter new password:
Password for user 'admin' changed successfully
Please write this password change to memory{write memory} to be persistent.
rfs7000-37FABE#write memory
OK
rfs7000-37FABE>
2.1.3 clear

User Exec Commands

Clears parameters, cache entries, table entries, and other similar entries. The clear command is available for specific commands only. The information cleared, using this command, depends on the mode where the clear command is executed.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
clear [arp-cache|bonjour|cdp|counters|crypto|event-history|gre|ip|ipv6|lldp|
  mac-address-table|mint|role|rtls|smart-cache|spanning-tree|traffic-shape|vrrp]
clear arp-cache {on <DEVICE-NAME>}
clear bonjour cache {on <DEVICE-NAME>}
clear [cdp|lldp] neighbors {on <DEVICE-NAME>}
clear counters [ap|radio|wireless-client]
clear counters [ap {<MAC>}|radio {<MAC>/DEVICE-NAME>} {<1-X>}|wireless-client {<MAC>}
  {on <DEVICE-OR-DOMAIN-NAME>})
clear crypto [ike|ipsec] sa
  clear crypto ike sa [{<IP>}|all] {on <DEVICE-NAME>}
clear crypto ipsec sa {on <DEVICE-NAME>}
clear event-history
clear gre stats {on <DEVICE-NAME>}
clear ip [bgp|dhcp|ospf]
clear ip bgp [<IP>|all|external|process]
clear ip bgp [<IP]|all external} {in|on|out|soft}
clear ip bgp [<IP>|all external} {in prefix-filter} {on <DEVICE-NAME>}
clear ip bgp [<IP]|all external} {out} {on <DEVICE-NAME>])
clear ip bgp [<IP]|all external} {soft} {in|out}} {on <DEVICE-NAME>}
clear ip bgp process {on <DEVICE-NAME>}
clear ip dhcp bindings [{<IP}|all] {on <DEVICE-NAME>}
clear ip ospf process {on <DEVICE-NAME>}
clear ipv6 neighbor-cache {on <DEVICE-NAME>}
clear mac-address-table {address|interface|vlan} {on <DEVICE-NAME>}
clear mac-address-table {address <MAC>|vlan <1-4094>} {on <DEVICE-NAME>}
clear mac-address-table {interface [IF-NAME]|ge <1-X}|port-channel <1-X>
  |t1e1 <1-4}|<1-1}|up <1-X}|vmif <1-X}|xge <1-4>} {on <DEVICE-NAME>}
clear mint mlcp history {on <DEVICE-NAME>}
clear role ldap-stats {on <DEVICE-NAME>}
```
clear rtls [aeroscout|ekahau]
clear rtls [aeroscout|ekahau] \{<MAC/DEVICE-NAME> \{on <DEVICE-OR-DOMAIN-NAME>\}\}
on <DEVICE-OR-DOMAIN-NAME>

clear spanning-tree detected-protocols \{interface|on\}
clear spanning-tree detected-protocols \{on <DEVICE-NAME>\}
clear spanning-tree detected-protocols \{interface \{<INTERFACE-NAME>|ge <1-X>|me1|port-channel <1-X>|pppoe1|up1|vian <1-4094>|wwan1|vmif <1-X>\}\} \{on <DEVICE-NAME>\}

clear traffic-shape statistics class <1-4> \{(on <DEVICE-NAME>\}]
clear vrrp [error-stats|stats] \{on <DEVICE-NAME>\}

The following clear command is specific to the NX45XX, NX65XX, and NX9XXX series service platforms:

clear smart-cache storage [all|url-regex <WORD>] \{on <DEVICE-NAME>\}

**Parameters**

- **clear arp-cache** \{on <DEVICE-NAME>\}

<table>
<thead>
<tr>
<th>arp-cache</th>
<th>Clears Address Resolution Protocol (ARP) cache entries on a device. This protocol matches layer 3 IP addresses to layer 2 MAC addresses.</th>
</tr>
</thead>
</table>
| on <DEVICE-NAME> | Optional. Clears ARP cache entries on a specified device  
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

- **clear bonjour cache** \{on <DEVICE-NAME>\}

<table>
<thead>
<tr>
<th>bonjour cache</th>
<th>Clears all Bonjour cached statistics. Once cleared the system has to re-discover available Bonjour services.</th>
</tr>
</thead>
</table>
| on <DEVICE-NAME> | Optional. Clears all Bonjour cached statistics on a specified device  
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

- **clear [cdp|lldp] neighbors** \{on <DEVICE-NAME>\}

| cdp | Clears Cisco Discovery Protocol (CDP) table entries |
| lldp | Clears Link Layer Discovery Protocol (LLDP) table entries |
| neighbors | Clears CDP or LLDP neighbor table entries based on the option selected in the preceding step |
| on <DEVICE-NAME> | Optional. Clears CDP or LLDP neighbor table entries on a specified device  
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

- **clear counters [ap \{<MAC>\}|radio \{<MAC/DEVICE-NAME>\} \{<1-X>\}|wireless-client \{<MAC>\}] \{(on <DEVICE-OR-DOMAIN-NAME>\}]

| counters | Clears counters based on the parameters passed. The options are: AP, radio, and wireless clients. |
| ap <MAC> | Clears counters for all APs or a specified AP  
  • <MAC> – Optional. Specify the AP’s MAC address. |
<p>| <strong>Note:</strong> If no MAC address is specified, all AP counters are cleared. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| **radio**  
<MAC/DEVICE-NAME> <1-X> | Clears radio interface counters on a specified device or on all devices  
• <MAC/DEVICE-NAME> – Optional. Specify the device’s hostname or MAC address. Optionally, append the radio interface number (to the radio ID) using one of the following formats: AA-BB-CC-DD-EE-FF:RX or HOSTNAME:RX (where RX is the interface number).  
• <1-X> – Optional. Identifies the radio interface by its index. Specify the radio interface index, if not specified as part of the radio ID. The number of radio interfaces available varies with the access point type.  
If no device name or MAC address is specified, all radio interface counters are cleared. |
| **wireless-client**  
<MAC> | Clears counters for all wireless clients or a specified wireless client  
• <MAC> – Optional. Specify the wireless client’s MAC address.  
If no MAC address is specified, all wireless client counters are cleared. |
| **on <DEVICE-OR-DOMAIN-NAME>** | The following option is common to all of the above keywords:  
• on <DEVICE-OR-DOMAIN-NAME> – Optional. Clears AP, radio, or wireless client counters on a specified device  
• <DEVICE-OR-DOMAIN-NAME> – Specify the name of the AP, wireless controller, service platform, or RF Domain. |
| **crypto**  
ike sa [<IP>|all] {on <DEVICE-NAME>} | Clears encryption module database  
ike sa [<IP>|all] | Clears Internet Key Exchange (IKE) security associations (SAs)  
• <IP> – Clears IKE SA entries for the peer identified by the <IP> keyword  
• all – Clears IKE SA entries for all peers |
| **on <DEVICE-NAME>** | Optional. Clears IKE SA entries, for a specified peer or all peers, on a specified device  
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| **clear crypto ike sa [<IP>|all] {on <DEVICE-NAME>}** |  
• clear crypto ike sa [<IP>|all] {on <DEVICE-NAME>} |
| **crypto**  
ipsec sa on <DEVICE-NAME> | Clears encryption module database  
ipsec sa on <DEVICE-NAME> | Clears Internet Protocol Security (IPSec) database SAs  
• on <DEVICE-NAME> – Optional. Clears IPSec SA entries on a specified device  
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| **clear crypto ipsec sa {on <DEVICE-NAME>}** |  
• clear crypto ipsec sa {on <DEVICE-NAME>} |
| **gre stats**  
on <DEVICE-NAME> | Clears GRE tunnel statistics  
on <DEVICE-NAME> | Optional. Clears GRE tunnel statistics on a specified device  
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| **clear gre stats {on <DEVICE-NAME>}** |  
• clear gre stats {on <DEVICE-NAME>} |
| **event-history** | Clears event history cache entries  
event-history |
### clear ip bgp [<IP>|all|external] {in prefix-filter} {on <DEVICE-NAME>}

**ip bgp [<IP>|all|external]**
- Clears on-going BGP sessions based on the option selected
  - `<IP>` – Clears BGP session with the peer identified by the `<IP>` keyword. Specify the BGP peer’s IP address.
  - `all` – Clears all BGP peer sessions
  - `external` – Clears external BGP (eBGP) peer sessions

This command is applicable only to the RFS4000, RFS6000, NX45XX, NX65XX, NX9000, and NX9600 platforms.

Modifications made to BGP settings (BGP access lists, weight, distance, route-maps, versions, routing policy, etc.) take effect only after on-going BGP sessions are cleared. The `clear > ip > bgp` command clears BGP sessions. To reduce loss of route updates during the process, use the ‘soft’ option. Soft reconfiguration stores inbound/outbound route updates to be processed later and updated to the routing table. This requires high memory usage.

**in prefix-filter**
- Optional. Clears inbound route updates
  - prefix-filter – Optional. Clears the existing Outbound Route Filtering (ORF) prefix-list

**on <DEVICE-NAME>**
- Optional. Clears route updates on a specified device
  - `<DEVICE-NAME>` – Specify the name of the AP or service platform.

### clear ip bgp [<IP>|all|external] {out} {on <DEVICE-NAME>}

**ip bgp [<IP>|all|external]**
- Clears on-going BGP sessions based on the option selected
  - `<IP>` – Clears BGP session with the peer identified by the `<IP>` keyword. Specify the BGP peer’s IP address.
  - `all` – Clears all BGP peer sessions
  - `external` – Clears eBGP peer sessions

This command is applicable only to the RFS4000, RFS6000, NX45XX, NX65XX, NX9000, and NX9600 platforms.

Modifications made to BGP settings (BGP access lists, weight, distance, route-maps, versions, routing policy, etc.) take effect only after on-going BGP sessions are cleared. The `clear > ip > bgp` command clears BGP sessions. To reduce loss of route updates during the process, use the ‘soft’ option. Soft reconfiguration stores inbound/outbound route updates to be processed later and updated to the routing table. This requires high memory usage.

**out**
- Optional. Clears outbound route updates. Optionally specify the device on which to execute this command.

**on <DEVICE-NAME>**
- The following keyword is recursive and optional.
  - on <DEVICE-NAME> – Optional. Clears BGP sessions on a specified device
  - `<DEVICE-NAME>` – Specify the name of the AP or service platform.

### clear ip bgp [<IP>|all|external] {soft {in|out}} {on <DEVICE-NAME>}

**ip bgp [<IP>|all|external]**
- Clears on-going BGP sessions based on the option selected
  - `<IP>` – Clears the BGP peer session with the peer identified by the `<IP>` keyword. Specify the BGP peer’s IP address.
  - `all` – Clears all BGP peer sessions

Contd..
### USER EXEC MODE COMMANDS 2-13

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear ip &lt;DEVICE-NAME&gt; bgp</td>
<td>Clears BGP sessions. To reduce loss of route updates during the process, use the ‘soft’ option. Soft reconfiguration stores inbound/outbound route updates to be processed later and updated to the routing table. This requires high memory usage.</td>
</tr>
<tr>
<td>soft {in</td>
<td>out}</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Initiates soft reconfiguration inbound/outbound route updates on a specified device</td>
</tr>
<tr>
<td>ip bgp process</td>
<td>Clears all BGP processes running. This command is applicable only to the RFS4000, RFS6000, NX45XX, NX65XX, NX9000, and NX9600 platforms.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears all BGP processes on a specified device</td>
</tr>
<tr>
<td>clear ip dhcp bindings</td>
<td>Clears DHCP connections and server bindings</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>Clears specific address binding entries. Specify the IP address to clear binding entries.</td>
</tr>
<tr>
<td>all</td>
<td>Clears all address binding entries</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears a specified address binding or all address bindings on a specified device</td>
</tr>
<tr>
<td>ip ospf process</td>
<td>Clears already enabled Open Shortest Path First (OSPF) process and restarts the process. OSPF is a link-state interior gateway protocol (IGP). OSPF routes IP packets within a single routing domain (autonomous system), like an enterprise LAN. OSPF gathers link state information from neighboring routers and constructs a network topology. The topology determines the routing table presented to the Internet Layer, which makes routing decisions based solely on the destination IP address found in IP packets.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears OSPF process on a specified device</td>
</tr>
<tr>
<td>clear ipv6 neighbor-cache {on &lt;DEVICE-NAME&gt;}</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>clear ipv6 neighbor-cache</td>
<td>Clears IPv6 neighbor cache entries</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears IPv6 neighbor cache entries on a specified device</td>
</tr>
<tr>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
<td></td>
</tr>
</tbody>
</table>

| clear mac-address-table {address <MAC>|vlan <1-4094>} {on <DEVICE-NAME>} |
|-----------------------------------------------------------------------------|
| mac-address-table | Clears the MAC address forwarding table |
| address <MAC> | Optional. Clears a specified MAC address from the MAC address table. |
| • <MAC> – Specify the MAC address in one of the following formats: AAbb-CC-DD-EE-FF or AA:BB:CC:DD:EE:FF or AAbb.CCDD.EEFF |
| vlan <1-4094> | Optional. Clears all MAC addresses for a specified VLAN |
| • <1-4094> – Specify the VLAN ID from 1 - 4094. |
| on <DEVICE-NAME> | Optional. Clears a single MAC entry or all MAC entries, for the specified VLAN on a specified device |
| • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| On the NX45XX and NX65XX series service platform, this command clears the MAC address forwarding table on the device’s hardware and not the dataplane. |

<p>| clear mac-address-table interface [&lt;IF-NAME&gt;|ge &lt;1-X&gt;|port-channel &lt;1-X&gt;|t1e1 &lt;1-4&gt; &lt;1-1&gt;|up &lt;1-2&gt;|vmif &lt;1-X&gt;|xge &lt;1-4&gt;] {on &lt;DEVICE-NAME&gt;} |
|----------------------------------------------------------------------------------------------|
| mac-address-table | Clears the MAC address forwarding table |
| interface | Clears all MAC addresses for the selected interface. Use the options available to specify the interface. |
| &lt;IF-NAME&gt; | Clears MAC address forwarding table for the specified layer 2 interface (Ethernet port) |
| • &lt;IF-NAME&gt; – Specify the layer 2 interface name. |
| ge &lt;1-X&gt; | Clears MAC address forwarding table for the specified GigabitEthernet interface |
| • &lt;1-X&gt; – Specify the GigabitEthernet interface index from 1 - X. |
| The number of Ethernet interfaces supported varies for different device types. For example the NX45XX and NX65XX support 24 GE interfaces. Where as, RFS4000 supports 5 GE interfaces. |
| port-channel &lt;1-X&gt; | Clears MAC address forwarding table for the specified port-channel interface |
| • &lt;1-X&gt; – Specify the port-channel interface index from 1 - X. |
| The number of port-channel interfaces supported varies for different device types. For example the NX45XX and NX65XX support 13 port-channels. Where as, RFS4000 supports 3 port-channels. |
| t1e1 &lt;1-4&gt; &lt;1-1&gt; | Clears MAC address forwarding table for the specified T1E1L interface |
| • &lt;1-4&gt; – Specify the T1E1 interface index from 1 - 4. A maximum of 4 slots are available. Select the slot to clear the MAC address forwarding table. |
| • &lt;1-1&gt; – Specify the T1E1 port ID from 1 - 1. |
| The T1E1 interfaces are supported only on the NX45XX and NX65XX series service platforms. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| **up <1-X>**     | Clears MAC address forwarding table for the WAN Ethernet interface  
The number of WAN Ethernet interfaces supported varies for different devices. The RFS4000 and RFS6000 devices support 1 WAN Ethernet interface. The NX45XX supports 2 WAN Ethernet interfaces. |
| **vmif <1-X>**   | Clears MAC address forwarding table for the VM interface  
• <1-X> – Specify the VM interface index from 1 - X.  
The VMIF interfaces are supported only on the NX45XX, NX65XX, NX9500, and NX9510 series service platforms. The number of supported VMIFs varies for different device types. |
| **xge <1-4>**    | Clears MAC address forwarding table for the specified TenGigabitEthernet interface  
• <1-4> – Specify the GigabitEthernet interface index from 1 - 4.  
This interface is supported only on the NX9000 series service platforms. |
| **on <DEVICE-NAME>** | Optional. Clears the MAC address forwarding table, for the selected interface, on a specified device  
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| **mint**         | Clears MiNT related information                                                                                                                                                                            |
| **mlcp history** | Clears MiNT Link Creation Protocol (MLCP) client history                                                                                                                                                      |
| **on <DEVICE-NAME>** | Optional. Clears MLCP client history on a specified device  
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| **role ldap-stats** | Clears Lightweight Directory Access Protocol (LDAP) server statistics                                                                                                                                            |
| **on <DEVICE-NAME>** | Optional. Clears LDAP server statistics on a specified device  
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| **clear rts [aeroscout|ekahau] <MAC/DEVICE-NAME> [on <DEVICE-OR-DOMAIN-NAME>]** | Clears Real Time Location Service (RTLS) statistics  
This keyword is common to the ‘aeroscout’ and ‘ekahau’ parameters.  
• <MAC/DEVICE-NAME> – Optional. Clears Aeroscout or Ekahau RTLS statistics on a specified AP, wireless controller, or service platform. Specify the AP’s MAC address or hostname. |
| **rts**          | Clears Real Time Location Service (RTLS) statistics                                                                                                                                                           |
| **aeroscout**    | Clears RTLS Aeroscout statistics                                                                                                                                                                              |
| **ekahau**       | Clears RTLS Ekahau statistics                                                                                                                                                                                |

*Note: The number of WAN Ethernet interfaces supported varies for different devices. The RFS4000 and RFS6000 devices support 1 WAN Ethernet interface. The NX45XX supports 2 WAN Ethernet interfaces.*
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear spanning-tree detected-protocols {on &lt;DEVICE-NAME&gt;}</td>
<td>Clears detected spanning tree entries on an interface and restarts protocol migration.</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Optional. Clears spanning tree entries on a specified device.</td>
</tr>
<tr>
<td>detected-protocols</td>
<td>Specifies the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td>interface [&lt;INTERFACE-NAME&gt;</td>
<td>ge &lt;1-X&gt;</td>
</tr>
<tr>
<td>detected-protocols</td>
<td>Specifies the interface name.</td>
</tr>
<tr>
<td>ge &lt;1-X&gt;</td>
<td>Clears detected spanning tree entries for the selected GigabitEthernet interface. Select the GigabitEthernet interface index from 1 - X.</td>
</tr>
<tr>
<td>The number of Ethernet interfaces supported varies for different device types. For example, the NX45XX and NX65XX support 24 GE interfaces. Where as, RFS4000 supports 5 GE interfaces.</td>
<td></td>
</tr>
<tr>
<td>me1</td>
<td>Clears FastEthernet interface spanning tree entries.</td>
</tr>
<tr>
<td>port-channel &lt;1-X&gt;</td>
<td>Clears detected spanning tree entries for the selected port channel interface. Select the port channel index from 1 - X.</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>The number of port-channel interfaces supported varies for different device types. For example, the NX45XX and NX65XX support 13 port-channels. Where as, RFS4000 supports 3 port-channels.</td>
</tr>
<tr>
<td>pppoe1</td>
<td>Clears detected spanning tree entries for Point-to-Point Protocol over Ethernet (PPPoE) interface.</td>
</tr>
<tr>
<td>up1</td>
<td>Clears detected spanning tree entries for the WAN Ethernet interface.</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Clears detected spanning tree entries for the selected VLAN interface. Select a Switch Virtual Interface (SVI) VLAN ID from 1-4094.</td>
</tr>
<tr>
<td>wwan1</td>
<td>Clears detected spanning tree entries for wireless WAN interface.</td>
</tr>
<tr>
<td>vmif &lt;1-X&gt;</td>
<td>Clears detected spanning tree entries for VM interfaces. The VMIF interfaces are supported only on the NX45XX, NX65XX, NX9500, and NX9510 series service platforms. The number of supported VMIFs varies for different device types.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears spanning tree entries on a specified device.</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
<td>Specifies the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>
### clear traffic-shape statistics class <1-4> (on <DEVICE-NAME>)

<table>
<thead>
<tr>
<th>traffic-shape statistics</th>
<th>Clears traffic shaping statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>class &lt;1-4&gt;</td>
<td>Clears traffic shaping statistics for a specific traffic class</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4&gt; – Specify the traffic class from 1 - 4.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> If the traffic class is not specified, the system clears all traffic shaping statistics.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears traffic shaping statistics for the specified traffic class on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the access point, wireless controller, or service platform.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> For more information on configuring traffic-shape, see <code>traffic-shape</code>.</td>
</tr>
</tbody>
</table>

### clear vrrp [error-stats|stats] (on <DEVICE-NAME>)

<table>
<thead>
<tr>
<th>vrrp</th>
<th>Clears a device's Virtual Router Redundancy Protocol (VRRP) statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>error-stats</td>
<td>Clears global error statistics</td>
</tr>
<tr>
<td>stats</td>
<td>Clears VRRP related statistics</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following keywords are common to the 'error-stats' and 'stats' parameters:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Clears VRRP statistics on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

### clear smart-cache storage [all|url-regex <WORD>] (on <DEVICE-NAME>)

<table>
<thead>
<tr>
<th>smart-cache</th>
<th>Clears the smart-cache storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>storage [all</td>
<td>regex &lt;WORD&gt;]</td>
</tr>
<tr>
<td></td>
<td>• all – Clears all cached content</td>
</tr>
<tr>
<td></td>
<td>• regex &lt;WORD&gt; – Clears only those URLs matching the specified expression</td>
</tr>
<tr>
<td></td>
<td>• &lt;WORD&gt; – Provide the URL in the following format: e.g. `.xxx\V\.+.(flv</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears stored content on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>
Examples

```
rfs4000-229D58>clear event-history

rfs4000-229D58>clear spanning-tree detected-protocols interface port-channel 1
rfs4000-229D58>clear spanning-tree detected-protocols interface ge 1

rfs4000-229D58>show lldp neighbors
-------------------------
Chassis ID: 00-23-68-88-0D-A7
System Name: rfs4000-880DA7
Platform: RFS-4011-11110-US, Version 5.8.4.0-008D
Capabilities: Bridge WLAN Access Point Router
Enabled Capabilities: Bridge WLAN Access Point Router
Local Interface: ge5, Port ID (outgoing port): ge5
TTL: 176 sec
Management Addresses: 192.168.13.8,192.168.0.1,1.2.3.4
rfs4000-229D58>

rfs4000-229D58>clear lldp neighbors
rfs4000-229D58>show lldp neighbors
rfs4000-229D58>

rfs4000-229D58>show cdp neighbors
--------------------------------------------------------------------------------
Device ID           Platform        Local Intrfce    Port ID      Duplex
--------------------------------------------------------------------------------
 rfs4000-880DA7    RFS-4011-11110-US    ge1              ge1        full
 rfs7000-37FDF2    RFS-7010-1000-WR     ge1              ge1        full
 rfs6000-434CAA    RFS6000              ge1              ge1        full
 ap7131-139B34     AP7131N              ge1              ge1        full
--------------------------------------------------------------------------------
rfs4000-229D58>

rfs4000-229D58>clear cdp neighbors
rfs4000-229D58>show cdp neighbors
--------------------------------------------------------------------------------
Device ID         Platform     Local Intrfce      Port ID        Duplex
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
rfs4000-229D58>

rfs4000-229D58>clear role ldap-stats
rfs4000-229D58>show role ldap-stats
No ROLE LDAP statistics found.
rfs4000-229D58>

rfs4000-229D58>show mac-address-table
--------------------------------------------------------
BRIDGE VLAN PORT   MAC               STATE
--------------------------------------------------------
 1   1    ge5     00-02-B3-28-D1-55 forward
 1   1    ge5     00-0F-8F-19-BA-4C forward
 1   1    ge5     B4-C7-99-5C-FA-8E forward
 1   1    ge5     00-23-68-0F-43-D8 forward
 1   1    ge5     00-15-70-38-06-49 forward
 1   1    ge5     00-23-68-13-9B-34 forward
 1   1    ge5     B4-C7-99-58-72-58 forward
 1   1    ge5     B4-C7-99-5C-FA-2B forward
 1   1    ge5     00-15-70-37-FD-F2 forward
 1   1    ge5     B4-C7-99-6C-88-09 forward
 1   1    ge5     B4-C7-99-71-17-28 forward
```
In the following example the first MAC address in the table has been cleared. Now the table has only 15 entries.

<table>
<thead>
<tr>
<th>BRIDGE</th>
<th>VLAN</th>
<th>PORT</th>
<th>MAC</th>
<th>STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>00-0F-8F-19-BA-4C</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>B4-C7-99-5C-FA-8E</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>00-23-68-0F-43-D8</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>00-15-70-38-06-49</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>00-23-68-13-9B-34</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>B4-C7-99-58-72-58</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>00-15-70-81-74-2D</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>B4-C7-99-5C-FA-2B</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>00-15-70-37-FD-F2</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>B4-C7-99-6C-88-09</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>B4-C7-99-71-17-28</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>00-0F-8F-18-10-91</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>00-23-68-88-0D-AC</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>00-A0-F8-68-D5-5C</td>
<td>forward</td>
</tr>
</tbody>
</table>

Total number of MACs displayed: **15**
2.1.4 clock

User Exec Commands

Sets a device’s system clock. By default all WiNG devices are shipped with the time zone and time format set to UTC and 24-hour clock respectively. If a device’s clock is set without resetting the time zone, the time is displayed relative to the Universal Time Coordinated (UTC) – Greenwich Time. For example, San Jose is approximately 7 or 8 hours (depending on the time of the year) behind the UTC time. If the time at Greenwich, UK is 15:00:00 UTC, at San Jose it will display as 8:00:00 or 7:00:00 UTC. To display time in the local time zone format, in the device’s configuration mode, use the timezone command to reset the time zone. You can also reset the time zone at the RF Domain level. When configured as RF Domain setting, it applies to all devices within the domain. Configuring the local time zone prior to setting the clock is recommended. For more information on configuring RF Domain time zone, see timezone.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

clock set <HH:MM:SS> <1-31> <MONTH> <1993-2035> {on <DEVICE-NAME>}

Parameters

- clock set <HH:MM:SS> <1-31> <MONTH> <1993-2035> {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clock set</td>
<td>Sets a device’s software system clock</td>
</tr>
<tr>
<td><a href="">HH:MM:SS</a></td>
<td>Sets the current time (in military format hours, minutes, and seconds)</td>
</tr>
<tr>
<td>Note:</td>
<td>By default, the WiNG software displays time in the 24-hour clock format. This setting cannot be changed.</td>
</tr>
<tr>
<td>&lt;1-31&gt;</td>
<td>Sets the numerical day of the month</td>
</tr>
<tr>
<td>&lt;MONTH&gt;</td>
<td>Sets the month of the year (Jan to Dec)</td>
</tr>
<tr>
<td>&lt;1993-2035&gt;</td>
<td>Sets a valid four digit year from 1993 - 2035</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Sets the clock on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

Examples

The following commands set the time zone and clock for the logged device:

nx4500-5CFA8E(config-device-B4-C7-99-5C-FA-8E)#timezone America/Los_Angeles

nx4500-5CFA8E>clock set 11:24:00 14 Jan 2016

nx4500-5CFA8E>show clock
2016-01-14 11:24:07 PDT

nx4500-5CFA8E>

Note, if the clock is set without resetting the time zone, the time displays as UTC time, as shown in the following example:

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#show clock
2016-01-14 11:35:10 UTC

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#
2.1.5 **cluster**

*User Exec Commands*

Initiates cluster context. The cluster context provides centralized management to configure all cluster members from any one member.

Commands executed under this context are executed on all members of the cluster.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**
```
cluster start-election
```

**Parameters**
- `start-election`

**Examples**
```
rfs7000-37FABE>cluster start-election
rfs7000-37FABE>
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>create-cluster</code></td>
<td>Creates a new cluster on the specified device</td>
</tr>
<tr>
<td><code>join-cluster</code></td>
<td>Adds a wireless controller or service platform, as a member, to an existing cluster of controllers</td>
</tr>
</tbody>
</table>
2.1.6 connect

User Exec Commands

Begins a console connection to a remote device using the remote device’s MiNT ID or name.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
connect [mint-id <MINT-ID>|<REMOTE-DEVICE-NAME>]

Parameters
- connect [mint-id <MINT-ID>|<REMOTE-DEVICE-NAME>]

<table>
<thead>
<tr>
<th>mint-id &lt;MINT-ID&gt;</th>
<th>Connects to the remote system using its MiNT ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;REMOTE-DEVICE-NAME&gt;</td>
<td>Connects to the remote system using its name</td>
</tr>
</tbody>
</table>

Examples

nx4500-5CFA2B>show mint lsp-db
6 LSPs in LSP-db of 19.5C.FA.2B:
LSP 19.58.72.58 at level 1, hostname "ap5142-587258", 5 adjacencies, seqnum 643541
LSP 19.5C.FA.2B at level 1, hostname "nx4500-5CFA2B", 5 adjacencies, seqnum 293584
LSP 19.5C.FA.8E at level 1, hostname "nx4500-5CFA8E", 5 adjacencies, seqnum 291299
LSP 19.6C.88.09 at level 1, hostname "nx9500-6C8809", 5 adjacencies, seqnum 292181
LSP 19.6D.CD.4B at level 1, hostname "rfs7000-6DCD4B", 5 adjacencies, seqnum 129177
LSP 19.71.17.28 at level 1, hostname "ap8132-711728", 5 adjacencies, seqnum 323509
nx4500-5CFA2B>

nx4500-5CFA2B>connect mint-id 19.71.17.28
Entering character mode
Escape character is "^]".

AP8132 release 5.8.4.0-008D
ap8132-711728 login:
2.1.7 create-cluster

User Exec Commands

Creates a new device cluster with the specified name and assigns it an IP address and routing level.

A cluster (or redundancy group) is a set of controllers or service platforms (nodes) uniquely defined by a profile configuration. Within the cluster, members discover and establish connections to other members and provide wireless network self-healing support in the event of member's failure.

A cluster's load is typically distributed evenly amongst its members. An administrator needs to define how often the profile is load balanced for radio distribution, as radios can come and go and members join and exit the cluster.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

create-cluster name <CLUSTER-NAME> ip <IP> {level [1/2]}

Parameters

- create-cluster name <CLUSTER-NAME> ip <IP> {level [1/2]}

<table>
<thead>
<tr>
<th>create-cluster</th>
<th>Creates a cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>name &lt;CLUSTER-NAME&gt;</td>
<td>Configures the cluster name</td>
</tr>
<tr>
<td></td>
<td>• &lt;CLUSTER-NAME&gt; – Specify a cluster name. Define a name for the cluster name unique to its configuration or profile support requirements. The name cannot exceed 64 characters.</td>
</tr>
<tr>
<td>ip &lt;IP&gt;</td>
<td>Specifies the device’s IP address used for cluster creation</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP&gt; – Specify the device’s IP address in the A.B.C.D format.</td>
</tr>
<tr>
<td>level [1</td>
<td>2]</td>
</tr>
<tr>
<td></td>
<td>• 1 – Configures level 1 (local) routing</td>
</tr>
<tr>
<td></td>
<td>• 2 – Configures level 2 (inter-site) routing</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58>create-cluster name TechPubs ip 192.168.13.13 level 1
... creating cluster
... committing the changes
... saving the changes
Please Wait .
[OK]
rfs4000-229D58>

rfs4000-229D58>show context
!
! Configuration of RFS4000 version 5.8.4.0-008D
!
!
version 2.5
!
!
client-identity Android-2-2
dhcp 1 message-type request option 55 exact hexstring 01792103061c333a3b
dhcp 6 message-type request option 60 exact ascii "dhcpcd 4.0.15"
!
ipv6 enable
no ipv6 request-dhcpv6-options
ipv6 address 2001:10:10:10:10:10:10:2/64
interface vlan2
```
ip address 1.2.3.5/24
no ipv6 enable
no ipv6 request-dhcpv6-options
cluster name TechPubs
cluster mode active
cluster member ip 192.168.13.13 level 1
cluster member ip 192.168.13.8 level 1
logging on
logging console debugging
logging buffered warnings
!
end
rfs4000-229D58>
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>cluster</code></td>
<td>Initiates cluster context. The cluster context provides centralized management to configure all cluster members from any one member.</td>
</tr>
<tr>
<td><code>join-cluster</code></td>
<td>Adds a device, as a member, to an existing cluster of devices</td>
</tr>
</tbody>
</table>
2.1.8 crypto

User Exec Commands

Enables digital certificate configuration and RSA Keypair management. Digital certificates are issued by CAs and contain user or device specific information, such as name, public key, IP address, serial number, company name, etc. Use this command to generate, delete, export, or import encrypted RSA Keypairs and generate Certificate Signing Request (CSR).

This command also enables trustpoint configuration. Trustpoints contain the CA's identity and configuration parameters.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

crypto [key|pki]

crypto key [export|generate|import|zeroize]

crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL> {background|on|passphrase}

crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL> {background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}

crypto key generate rsa <RSA-KEYPAIR-NAME> [2048|4096] {on <DEVICE-NAME>}

crypto key import rsa <RSA-KEYPAIR-NAME> <IMPORT-FROM-URL> {background|on|passphrase}

crypto key import rsa <RSA-KEYPAIR-NAME> <IMPORT-FROM-URL> {background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}

crypto key zeroize rsa <RSA-KEYPAIR-NAME> {force} {(on <DEVICE-NAME>)}

crypto pki [authenticate|export|generate|import|zeroize]

crypto pki authenticate <TRUSTPOINT-NAME> <LOCATION-URL> {background}

{(on <DEVICE-NAME>)}

crypto pki export [request|trustpoint]

crypto pki export request [generate-rsa-key|short|use-rsa-key] <RSA-KEYPAIR-NAME> [autogen-subject-name|subject-name]

crypto pki export request [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME> autogen-subject-name <EXPORT-TO-URL>,email <SEND-TO-EMAIL>,fqdn <FQDN>, ip-address <IP>

crypto pki export request [generate-rsa-key|short [generate-rsa-key|use-rsa-key]|use-rsa-key] <RSA-KEYPAIR-NAME> subject-name <COMMON-NAME> <COUNTRY> <STATE> <CITY> <ORGANIZATION> <ORGANIZATION-UNIT> <EXPORT-TO-URL>,email <SEND-TO-EMAIL>,fqdn <FQDN>,ip-address <IP>

crypto pki export trustpoint <TRUSTPOINT-NAME> <EXPORT-TO-URL> {background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}

crypto pki generate self-signed <TRUSTPOINT-NAME> [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME> [autogen-subject-name|subject-name]

crypto pki generate self-signed <TRUSTPOINT-NAME> [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME> autogen-subject-name (email <SEND-TO-EMAIL>,fqdn <FQDN>,ip-address <IP>,on <DEVICE-NAME>)

crypto pki generate self-signed <TRUSTPOINT-NAME> [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME> subject-name <COMMON-NAME> <COUNTRY> <STATE> <CITY> <ORGANIZATION> <ORGANIZATION-UNIT> (email <SEND-TO-EMAIL>,fqdn <FQDN>, ip-address <IP>,on <DEVICE-NAME>)}
crypto pki import [certificate|crl|trustpoint]
crypto pki import [certificate|crl] <TRUSTPOINT-NAME> <IMPORT-FROM-URL>
  {background} {(on <DEVICE-NAME>)}
crypto pki import trustpoint <TRUSTPOINT-NAME> <IMPORT-FROM-URL>
  {background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}
crypto pki zeroize trustpoint <TRUSTPOINT-NAME> {del-key} {(on <DEVICE-NAME>)}

Parameters

- crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL>
  {background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}

  key Enables RSA Keypair management. Use this command to export, import, generate, or delete a RSA key.

  export rsa <RSA-KEYPAIR-NAME>
  Exports an existing RSA Keypair to a specified destination
  • <RSA-KEYPAIR-NAME> – Specify the RSA Keypair name.

  <EXPORT-TO-URL>
  Specify the RSA Keypair destination address. Both IPv4 and IPv6 address formats are supported.
  After specifying the destination address (where the RSA Keypair is exported), configure one of the following parameters: background or passphrase.

  background Optional. Performs export operation in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the export on.

  passphrase <KEY-PASSPHRASE> background
  Optional. Encrypts RSA Keypair before exporting
  • <KEY-PASSPHRASE> – Specify a passphrase to encrypt the RSA Keypair.
  • background – Optional. Performs export operation in the background. After specifying the passphrase, optionally specify the device (access point or controller) to perform the export on.

  on <DEVICE-NAME>
  The following parameter is recursive and common to all of the above parameters:
  • on <DEVICE-NAME> – Optional. Performs export operation on a specified device
    • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

  • crypto key generate rsa <RSA-KEYPAIR-NAME> [2048|4096] {on <DEVICE-NAME>}

  key Enables RSA Keypair management. Use this command to export, import, generate, or delete a RSA key.

  generate rsa <RSA-KEYPAIR-NAME> [2048|4096]
  Generates a new RSA Keypair
  • <RSA-KEYPAIR-NAME> – Specify the RSA Keypair name.
  • [2048|4096] – Sets the size of the RSA key in bits. The options are 2048 bits and 4096 bits. The default size is 2048 bits.
  After specifying the key size, optionally specify the device (access point or controller) to generate the key on.

  on <DEVICE-NAME>
  Optional. Generates the new RSA Keypair on a specified device
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

  • crypto key import rsa <RSA-KEYPAIR-NAME> <IMPORT-FROM-URL>
    {background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}

  key Enables RSA Keypair management. Use this command to export, import, generate, or delete a RSA key.
### USER EXEC MODE COMMANDS

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `import rsa <RSA-KEYPAIR-NAME>` | Imports a RSA Keypair from a specified source  
  • `<RSA-KEYPAIR-NAME>` – Specify the RSA Keypair name. |
| `<IMPORT-FROM-URL>` | Specify the RSA Keypair source address. Both IPv4 and IPv6 address formats are supported.  
  After specifying the source address (where the RSA Keypair is imported from), configure one of the following parameters: background or passphrase. |
| `background` | Optional. Performs import operation in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the import on. |
| `passphrase <KEY-PASSPHRASE>` | Optional. Decrypts the RSA Keypair after importing  
  • `<KEY-PASSPHRASE>` – Specify the passphrase to decrypt the RSA Keypair.  
  • background – Optional. Performs import operation in the background. After specifying the passphrase, optionally specify the device (access point, controller, or service platform) to perform the import on. |
| `on <DEVICE-NAME>` | The following parameter is recursive and common to the ‘background’ and ‘passphrase’ keywords:  
  • `on <DEVICE-NAME>` – Optional. Performs import operation on a specific device  
  • `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform. |
| `zeroize rsa <RSA-KEYPAIR-NAME>` | Deletes a specified RSA Keypair  
  • `<RSA-KEYPAIR-NAME>` – Specify the RSA Keypair name.  
  **Note:** All device certificates associated with this key will also be deleted. |
| `force` | Optional. Forces deletion of all certificates associated with the specified RSA Keypair. Optionally specify a device on which to force certificate deletion. |
| `on <DEVICE-NAME>` | The following parameter is recursive and optional:  
  • `on <DEVICE-NAME>` – Optional. Deletes all certificates associated with the RSA Keypair on a specified device  
  • `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform. |
| `crypto key zeroize rsa <RSA-KEYPAIR-NAME> {force} {(on <DEVICE-NAME>)}{}` |
| `key` | Enables RSA Keypair management. Use this command to export, import, generate, or delete a RSA key. |
| `zeroize rsa <RSA-KEYPAIR-NAME>` | Deletes a specified RSA Keypair  
  • `<RSA-KEYPAIR-NAME>` – Specify the RSA Keypair name.  
  **Note:** All device certificates associated with this key will also be deleted. |
| `force` | Optional. Forces deletion of all certificates associated with the specified RSA Keypair. Optionally specify a device on which to force certificate deletion. |
| `on <DEVICE-NAME>` | The following parameter is recursive and optional:  
  • `on <DEVICE-NAME>` – Optional. Deletes all certificates associated with the RSA Keypair on a specified device  
  • `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform. |
| `crypto pki authenticate <TRUSTPOINT-NAME> <URL> {background} {(on <DEVICE-NAME>)}{}` |
| `pki` | Enables Private Key Infrastructure (PKI) management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated Certificate Authority (CA) certificates. |
| `authenticate <TRUSTPOINT-NAME>` | Authenticates a trustpoint and imports the corresponding CA certificate  
  • `<TRUSTPOINT-NAME>` – Specify the trustpoint name. |
| `<URL>` | Specify CA's location. Both IPv4 and IPv6 address formats are supported.  
  **Note:** The CA certificate is imported from the specified location. |
<table>
<thead>
<tr>
<th><strong>background</strong></th>
<th>Optional. Performs authentication in the background. If selecting this option, you can optionally specify the device (access point, controller, or service platform) to perform the export on.</th>
</tr>
</thead>
</table>
| **on <DEVICE-NAME>** | The following parameter is recursive and optional:  
  - on <DEVICE-NAME> – Optional. Performs authentication on a specified device  
  - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| **crypto pki export request [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME> autogen-subject-name (<EXPORT-TO-URL>,email <SEND-TO-EMAIL>,fqdn <FQDN>,ip-address <IP>)** | Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates. |
| **export request** | Exports CSR to the CA for a digital identity certificate. The CSR contains applicant’s details and RSA Keypair’s public key. |
| **[generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME>** | Generates a new RSA Keypair or uses an existing RSA Keypair  
  - generate-rsa-key – Generates a new RSA Keypair for digital authentication  
  - use-rsa-key – Uses an existing RSA Keypair for digital authentication  
  - <RSA-KEYPAIR-NAME> – If generating a new RSA Keypair, specify a name for it. If using an existing RSA Keypair, specify its name. |
| **autogen-subject-name** | Auto generates subject name from configuration parameters. The subject name identifies the certificate. |
| **<EXPORT-TO-URL>** | Specify the CA’s location. Both IPv4 and IPv6 address formats are supported. Note: The CSR is exported to the specified location. |
| **email <SEND-TO-EMAIL>** | Exports CSR to a specified e-mail address  
  - <SEND-TO-EMAIL> – Specify the CA’s e-mail address. |
| **fqdn <FQDN>** | Exports CSR to a specified Fully Qualified Domain Name (FQDN)  
  - <FQDN> – Specify the CA’s FQDN. |
| **ip-address <IP>** | Exports CSR to a specified device or system  
  - <IP> – Specify the CA’s IP address. |
| **crypto pki export request [generate-rsa-key|short [generate-rsa-key|use-rsa-key]|use-rsa-key] <RSA-KEYPAIR-NAME> subject-name <COMMON-NAME> <COUNTRY> <STATE> <CITY> <ORGANIZATION> <ORGANIZATION-UNIT> (<EXPORT-TO-URL>,email <SEND-TO-EMAIL>,fqdn <FQDN>,ip-address <IP>)** | Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates. |
| **export request** | Exports CSR to the CA for a digital identity certificate. The CSR contains applicant’s details and RSA Keypair’s public key. |
| **[generate-rsa-key|short [generate-rsa-key|use-rsa-key]|use-rsa-key] <RSA-KEYPAIR-NAME>** | Generates a new RSA Keypair or uses an existing RSA Keypair  
  - generate-rsa-key – Generates a new RSA Keypair for digital authentication  
  - short [generate-rsa-key|use-rsa-key] – Generates and exports a shorter version of the CSR  
  - generate-rsa-key – Generates a new RSA Keypair for digital authentication. If generating a new RSA Keypair, specify a name for it. Contd.. |
• use-rsa-key – Uses an existing RSA Keypair for digital authentication. If using an existing RSA Keypair, specify its name.
• use-rsa-key – Uses an existing RSA Keypair for digital authentication
  • <RSA-KEYPAIR-NAME> – If generating a new RSA Keypair, specify a name for it. If using an existing RSA Keypair, specify its name.

| subject-name <COMMON-NAMESPACE> | Configures a subject name, defined by the <COMMON-NAMESPACE> keyword, to identify the certificate
  • <COMMON-NAMESPACE> – Specify the common name used with the CA certificate. The name should enable you to identify the certificate easily (2 to 64 characters in length).

| <COUNTRY> | Sets the deployment country code (2 character ISO code)
| <STATE> | Sets the state name (2 to 64 characters in length)
| <CITY> | Sets the city name (2 to 64 characters in length)
| <ORGANIZATION> | Sets the organization name (2 to 64 characters in length)
| <ORGANIZATION-UNIT> | Sets the organization unit (2 to 64 characters in length)
| <EXPORT-TO-URL> | Specify the CA’s location. Both IPv4 and IPv6 address formats are supported.
  Note: The CSR is exported to the specified location.
| email <SEND-TO-EMAIL> | Exports CSR to a specified e-mail address
  • <SEND-TO-EMAIL> – Specify the CA’s e-mail address.
| fqdn <FQDN> | Exports CSR to a specified FQDN
  • <FQDN> – Specify the CA’s FQDN.
| ip-address <IP> | Exports CSR to a specified device or system
  • <IP> – Specify the CA’s IP address.

• crypto pki export trustpoint <TRUSTPOINT-NAME> <EXPORT-TO-URL> {background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}

| pki | Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates.
| export trustpoint <TRUSTPOINT-NAME> | Exports a trustpoint along with CA certificate, Certificate Revocation List (CRL), server certificate, and private key
  • <TRUSTPOINT-NAME> – Specify the trustpoint name (should be authenticated).
| <EXPORT-TO-URL> | Specify the destination address. Both IPv4 and IPv6 address formats are supported.
  The trustpoint is exported to the address specified here.
| background | Optional. Performs export operation in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the export on
| passphrase <KEY-PASSPHRASE> background | Optional. Encrypts the key with a passphrase before exporting
  • <KEY-PASSPHRASE> – Specify the passphrase to encrypt the trustpoint.
  • background – Optional. Performs export operation in the background. After specifying the passphrase, optionally specify the device (access point or controller) to perform the export on.
### `crypto pki generate self-signed <TRUSTPOINT-NAME>` [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME> autogen-subject-name [{(email <SEND-TO-EMAIL>,fqdn <FQDN>,ip-address <IP>,on <DEVICE-NAME>)}]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>generate-rsa-key</code></td>
<td>Generates a new RSA Keypair for digital authentication</td>
</tr>
<tr>
<td><code>use-rsa-key</code></td>
<td>Uses an existing RSA Keypair for digital authentication</td>
</tr>
<tr>
<td><code>&lt;RSA-KEYPAIR-NAME&gt;</code></td>
<td>Specify a name for the RSA Keypair</td>
</tr>
<tr>
<td><code>autogen-subject-name</code></td>
<td>Auto generates the subject name from the configuration parameters. The subject name helps to identify the certificate.</td>
</tr>
<tr>
<td><code>email &lt;SEND-TO-EMAIL&gt;</code></td>
<td>Exports the self-signed certificate to a specified e-mail address</td>
</tr>
<tr>
<td><code>fqdn &lt;FQDN&gt;</code></td>
<td>Exports the self-signed certificate to a specified FQDN</td>
</tr>
<tr>
<td><code>ip-address &lt;IP&gt;</code></td>
<td>Exports the self-signed certificate to a specified device or system</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>Exports the self-signed certificate on a specified device or system</td>
</tr>
</tbody>
</table>

### pki

Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated certificates.

### generate

Generates a certificate and a trustpoint

### self-signed

Generates a self-signed certificate and a trustpoint

### [generate-rsa-key|use-rsa-key]

Generates a new RSA Keypair, or uses an existing RSA Keypair

### auto-gen-subject-name

Auto generates the subject name from the configuration parameters. The subject name helps to identify the certificate.

### email <SEND-TO-EMAIL>

Optional. Exports the self-signed certificate to a specified e-mail address

### fqdn <FQDN>

Optional. Exports the self-signed certificate to a specified FQDN

### ip-address <IP>

Optional. Exports the self-signed certificate to a specified device or system

### on <DEVICE-NAME>

Optional. Exports the self-signed certificate on a specified device

### crypto pki generate self-signed <TRUSTPOINT-NAME> [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME> subject-name <COMMON-NAME> <COUNTRY> <STATE> <CITY> <ORGANIZATION> <ORGANIZATION-UNIT> [{(email <SEND-TO-EMAIL>,fqdn <FQDN>,ip-address <IP>,on <DEVICE-NAME>)}]

### pki

Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated certificates.

### generate self-signed

Generates a self-signed certificate and a trustpoint

### [generate-rsa-key|use-rsa-key]

Generates a new RSA Keypair, or uses an existing RSA Keypair

### auto-gen-subject-name

Auto generates the subject name from the configuration parameters. The subject name helps to identify the certificate.

### email <SEND-TO-EMAIL>

Optional. Exports the self-signed certificate to a specified e-mail address

### fqdn <FQDN>

Optional. Exports the self-signed certificate to a specified FQDN

### ip-address <IP>

Optional. Exports the self-signed certificate to a specified device or system

### on <DEVICE-NAME>

Optional. Exports the self-signed certificate on a specified device
**subject-name**

**<COMMON-NAME>**

Configures a subject name, defined by the `<COMMON-NAME>` keyword, to identify the certificate

- `<COMMON-NAME>` – Specify the common name used with this certificate. The name should enable you to identify the certificate easily and should not exceed 2 to 64 characters in length.

**<COUNTRY>**

Sets the deployment country code (2 character ISO code)

**<STATE>**

Sets the state name (2 to 64 characters in length)

**<CITY>**

Sets the city name (2 to 64 characters in length)

**<ORGANIZATION>**

Sets the organization name (2 to 64 characters in length)

**<ORGANIZATION-UNIT>**

Sets the organization unit (2 to 64 characters in length)

**email**

**<SEND-TO-EMAIL>**

Optional. Exports the self-signed certificate to a specified e-mail address

- `<SEND-TO-EMAIL>` – Specify the e-mail address.

**fqdn**

**<FQDN>**

Optional. Exports the self-signed certificate to a specified FQDN

- `<FQDN>` – Specify the FQDN.

**ip-address**

**<IP>**

Optional. Exports the self-signed certificate to a specified device or system

- `<IP>` – Specify the device’s IP address.

- **crypto pki import**

  `[certificate|crl] <TRUSTPOINT-NAME> <IMPORT-FROM-URL> {background} {(on <DEVICE-NAME>)}

**pki**

Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates.

**import**

Imports certificates, Certificate Revocation List (CRL), or a trustpoint to the selected device

**[certificate|crl]**

**<TRUSTPOINT-NAME>**

Imports a signed server certificate or CRL

- `certificate` – Imports signed server certificate
- `crl` – Imports CRL

- `<TRUSTPOINT-NAME>` – Specify the trustpoint name (should be authenticated).

**<IMPORT-FROM-URL>**

Specify the signed server certificate or CRL source address. Both IPv4 and IPv6 address formats are supported.
The server certificate or the CRL (based on the parameter passed in the preceding step) is imported from the location specified here.

**background**

Optional. Performs import operation in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the import on.

**on <DEVICE-NAME>**

The following parameter is recursive and optional:

- `on <DEVICE-NAME>` – Optional. Performs import operation on a specified device
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

- **crypto pki import trustpoint**

  `<TRUSTPOINT-NAME> <IMPORT-FROM-URL> {background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}

**pki**

Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>import</td>
<td>Imports certificates, CRL, or a trustpoint to the selected device</td>
</tr>
</tbody>
</table>
| trustpoint <TRUSTPOINT-NAME> | Imports a trustpoint and its associated CA certificate, server certificate, and private key  
  • <TRUSTPOINT-NAME> – Specify the trustpoint name (should be authenticated). |
| <IMPORT-FROM-URL> | Specify the trustpoint source address. Both IPv4 and IPv6 address formats are supported. |
| background | Optional. Performs import operation in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the import on. |
| passphrase <KEY-PASSPHRASE> background | Optional. Decrypts trustpoint with a passphrase after importing  
  • <KEY-PASSPHRASE> – Specify the passphrase. After specifying the passphrase, optionally specify the device to perform import on.  
  • background – Optional. Performs import operation in the background. After specifying the passphrase, optionally specify the device (access point or controller) to perform the import on. |
| on <DEVICE-NAME> | The following parameter is recursive and optional:  
  • on <DEVICE-NAME> – Optional. Performs import operation on a specified device  
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| pki | Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates. |
| zeroize trustpoint <TRUSTPOINT-NAME> | Deletes a trustpoint and its associated CA certificate, server certificate, and private key  
  • <TRUSTPOINT-NAME> – Specify the trustpoint name (should be authenticated). |
| del-key | Optional. Deletes the private key associated with the server certificate. Optionally specify the device to perform deletion on. |
| on <DEVICE-NAME> | The following parameter is recursive and optional:  
  • on <DEVICE-NAME> – Optional. Deletes the trustpoint on a specified device  
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

**Usage Guidelines**

The system supports both IPv4 and IPv6 address formats. Provide source and destination locations using any one of the following options:

- IPv4 URLs:
  - tftp://<hostname|IP>[[:port]/path/file
  - ftp://<username>:<password>@<hostname|IP>[[:port]/path/file
  - sftp://<username>@<hostname|IP>[[:port]/path/file
  - http://<hostname|IP>[[:port]/path/file
  - cf:/path/file
  - usb<n>:/path/file
- IPv6 URLs:
  
  - tftp://<hostname>[IPv6]>[:port]/path/file
  - ftp://<user>:<passwd>@<hostname>[IPv6]>[:port]/path/file
  - sftp://<user>:<passwd>@<hostname>[IPv6]>[:port]/path/file

Examples

```
rfs7000-37FABE> crypto key generate rsa key 1025
RSA Keypair successfully generated
rfs7000-37FABE>
```

```
rfs7000-37FABE> crypto key import rsa test123 url passphrase word background
RSA key import operation is started in background
rfs7000-37FABE>
```

```
rfs7000-37FABE> crypto pki generate self-signed word generate-rsa-key word auto-gen-
subject-name fqdn word
Successfully generated self-signed certificate
rfs7000-37FABE>
```

```
rfs7000-37FABE> crypto pki zeroize trustpoint word del-key
Successfully removed the trustpoint and associated certificates
%Warning: Applications associated with the trustpoint will start using default-trustpoint
rfs7000-37FABE>
```

```
rfs7000-37FABE> crypto pki authenticate word url background
Import of CA certificate started in background
rfs7000-37FABE>
```

```
rfs7000-37FABE> crypto pki import trustpoint word url passphrase word
Import operation started in background
rfs7000-37FABE>
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes server certificates, trustpoints and their associated certificates</td>
</tr>
</tbody>
</table>
2.1.9 crypto-cmp-cert-update

User Exec Commands

Triggers a Certificate Management Protocol (CMP) certificate update on a specified device or devices

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

crypto-cmp-cert-update <TRUSTPOINT-NAME> {on <DEVICE-NAME>}

Parameters

- crypto-cmp-cert-update <TRUSTPOINT-NAME> {on <DEVICE-NAME>}

Triggers a CMP certificate update on a specified device or devices

- <TRUSTPOINT-NAME> – Specify the target trustpoint name. A trustpoint represents a CA/identity pair containing the identity of the CA, CA specific configuration parameters, and an association with an enrolled identity certificate. Use the crypto-cmp-policy context mode to configure the trustpoint.
- on <DEVICE-NAME> – Optional. Initiates a CMP certificate update and response on a specified device or devices. Specify the name of the AP, wireless controller, or service platform. Multiple devices can be provided as a comma separated list.

Examples

rfs4000-229D58>crypto-cmp-cert-update test on B4-C7-99-71-17-28
CMP Cert update success
rfs4000-229D58>
2.1.10 database

User Exec Commands

Enables automatic repairing (vacuuming) and dropping of databases (Captive-portal and NSight). Vacuuming a database refers to the process of finding and reclaiming space left over from previous DELETE statements.

Supported in the following platforms:

- Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax

database [drop|repair]

database drop [all|captive-portal|nsight]

database repair {on <DEVICE-NAME>}

Parameters

- database drop [all|captive-portal|nsight]
  
- database repair {on <DEVICE-NAME>}

Examples

nx9500-6C8809>database repair on nx9500-6C8809

Related Commands

database-backup

Backs up captive-portal and/or NSight database to a specified location and file on an FTP or SFTP server

database-restore

Restores a previously exported database [captive-portal and/or NSight]
### 2.1.11 database-backup

- **User Exec Commands**

Backs up captive-portal and/or NSight database to a specified location and file on an FTP or SFTP server.

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600

#### Syntax

database-backup database [captive-portal|nsight] <URL>

#### Parameters
- database-backup database [captive-portal|nsight] <URL>

| database-backup database [captive-portal|nsight] | Backs up captive portal and/or NSight database to a specified location and file. Select the database to backup |
| <URL> | Configures the destination location. The database is backed up at the specified location. Specify the location URL in one of the following formats: |
| ftp://<user>:<passwd>@<hostname|IP>[[:port]]/path/file.tar.gz | sftp://<user>:<passwd>@<hostname|IP>[[:port]]/path/file.tar.gz |
| tftp://<hostname|IP>[[:port]]/path/file.tar.gz | 

#### Examples

nx9500-6C8809>database-backup database nsight ftp://anonymous:anonymous@192.168.13.10/backups/nsight/nsight.tar.gz

#### Related Commands

| database | Enables automatic repairing (vacuuming) and dropping of databases (Captive-portal and NSight) |
| database-restore | Restores a previously exported (backed up) database [captive-portal and/or NSight] |
### 2.1.12 database-restore

#### User Exec Commands

Restores a previously exported database [captive-portal and/or NSight]. Previously exported databases (backed up to a specified FTP or SFTP server) are restored from the backed-up location to the original database.

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600

#### Syntax

```
database-restore database [captive-portal|nsight] <URL>
```

#### Parameters

- `database-restore database [captive-portal|nsight] <URL>`

| **database-restore database [captive-portal|nsight]** | Restores previously exported (backed up) captive-portal and/or NSight database. Specify the database type:
|-----------------------------------------------------|---------------------------------------------------------------|
|                                                     | • captive-portal – Restores captive portal database
|                                                     | • nsight – Restores NSight database
|                                                     | After specifying the database type, configure the destination location and file name from where the files are restored.
| **<URL>**                                           | Configures the destination location. The database is restored from the specified location. Specify the location URL in one of the following formats:
|                                                     | ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file.tar.gz
|                                                     | sftp://<user>:<passwd>@<hostname|IP>[:port]/path/file.tar.gz
|                                                     | tftp://<hostname|IP>[:port]/path/file.tar.gz

#### Examples

```
nx9500-6C8809>database-restore database nsight
ftp://anonymous:anonymous@192.168.13.10/backups/nsight/nsight.tar.gz
```

#### Related Commands

<table>
<thead>
<tr>
<th><strong>database</strong></th>
<th>Enables automatic repairing (vacuuming) and dropping of databases (Captive-portal and NSight)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>database-backup</strong></td>
<td>Backs up captive-portal and/or NSight database to a specified location and file on an FTP or SFTP server</td>
</tr>
</tbody>
</table>
2.1.13 **device-upgrade**

> **User Exec Commands**

Enables firmware upgrade on an adopted device or a set of adopted devices (access points, wireless controllers, and service platforms). In an **hierarchically managed** (HM) network, this command enables centralized device upgradation across the network.

The WiNG HM network defines a three-tier structure, consisting of multiple wireless sites managed by a single **Network Operations Center** (NOC) controller. The NOC controller constitutes the first and the site controllers constitute the second tier of the hierarchy. The site controllers may or may not be grouped to form clusters. The site controllers in turn adopt and manage access points that form the third tier of the hierarchy.

---

**NOTE:** Hierarchical management allows the NOC controller to upgrade controllers and access points that are directly or indirectly adopted to it. However, ensure that the NOC controller is loaded with the correct firmware version.

---

All adopted devices (access points and second-level controllers) are referred to as the 'adoptee'. The adopting devices are the 'adopters'. A controller cannot be configured as an adoptee and an adopter simultaneously. In other words, a controller can either be an adopter (adopts another controller) or an adoptee (is adopted by another controller).

Network administrators can use the device-upgrade command to schedule firmware upgrades across adopted devices within the network. Devices are upgraded based on their device names, MAC addresses, or RF Domain. The firmware image used for the upgrade can either be user-defined or built-in.

The user-defined image is pulled from the defined location and applied to the device(s). Use the `device-upgrade > load-image` command to provide the image file name and location. User-defined images always get precedence over built-in images.

NOC and site controllers possess built-in firmware images for the various device types. If the administrator has not specified an image file name and location, the image on the controller is used to upgrade the device. The following example describes the various scenarios possible in the absence of a user-defined image.

A site controller has been scheduled to upgrade all adopted AP6562s. Before executing the upgrade, the site controller compares the image it possesses with the image on the NOC controller. In case of an image version mismatch, the site controller does the following:

1. If the site controller is a cluster member, it pulls the image:
   - From a cluster peer, provided the AP6562 image version on the peer and the NOC controller matches.
   - From the NOC controller, if the AP6562 image version on the peer and the NOC controller are mismatched.
   - From the NOC controller, if none of the cluster members possess a AP6562 image.

2. If the site controller is not a cluster member, it pulls the image from the NOC controller.

When upgrading devices in a RF Domain, the process is controlled and driven by the NOC controller. For example, in case of a scheduled upgrading of all AP6562s within an RF Domain, the NOC controller:

1. Adopts all controllers, in the RF Domain, to the NOC cluster and gets the status of each controller.

2. Upgrades all controllers, in the cluster, without rebooting them.

   Once the upgrade is complete, the following two scenarios are possible:

   **Scenario 1:** *If the upgrade/reboot options ARE NOT specified by the network administrator, the NOC controller:*
   
   a. Pushes the AP6562 image on to the RF Domain manager.
   b. Reboots the active controller within the RF Domain.
   c. Reboots standby controllers after the active controller has successfully rebooted.

   If the controllers are auto upgrade enabled, all AP6562s are upgraded after the controllers have rebooted and the APs have been re-adopted.

   **Scenario 2:** *If the upgrade/reboot options ARE specified by the network administrator, the NOC controller:*
a. Reboots the active controller followed by the standby controllers.
b. Pushes the AP6562 image file on to the RF Domain manager.
c. Initiates upgrades on all AP6562 within the RF Domain.

Ensure the RF Domain controllers are auto upgrade enabled.

**NOTE:** If the **persist-images** option is selected, the RF Domain manager retains the old firmware image, or else deletes it. For more information on enabling device upgrade on profiles and devices (including the 'persist-images' option), see **device-upgrade**.

**NOTE:** A NOC controller’s capacity is equal to, or higher than that of a site controller. The following devices can be deployed at NOC and sites:

- NOC controller – RFS7000, NX9000, NX95XX (NX9500 and NX9510), NX9600
- Site controller – RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX9000, or NX95XX

Within a HM network, the devices deployed as site controllers depends on the NOC controller device type. For more information on the adoption capabilities of various NOC controller devices, see Usage Guidelines (**NOC controller adoption matrix**).

**NOTE:** Standalone devices have to be manually upgraded.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

device-upgrade [<MAC/HOSTNAME>] all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45xx|nx55xx|nx65xx|nx75xx|nx9000|nx9600|vx9000|cancel-upgrade|load-image|rf-domain

device-upgrade <MAC/HOSTNAME> {no-reboot|reboot-time <TIME>|upgrade-time <TIME>} {no-reboot|reboot-time <TIME>}

device-upgrade all {force|no-reboot|reboot-time <TIME>|upgrade-time <TIME>} {no-reboot|reboot-time <TIME>}

device-upgrade [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45xx|nx55xx|nx65xx|nx75xx|nx9000|nx9600|vx9000] all {force|no-reboot|reboot-time <TIME>|upgrade-time <TIME>} {no-reboot|reboot-time <TIME>}

device-upgrade cancel-upgrade [<MAC/HOSTNAME>] all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45xx|nx55xx|nx65xx|nx75xx|nx9000|nx9600|vx9000|on rf-domain [<RF-DOMAIN-NAME>] all]
device-upgrade load-image [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45XX|nx5500|nx65XX|nx9000|nx9600|vx9000] {<IMAGE-URL>|on <DEVICE-OR-DOMAIN-NAME>}

device-upgrade rf-domain [<RF-DOMAIN-NAME>|all|containing <WORD>|filter location <WORD>] {<MAC/HOSTNAME>|force|from-controller|no-reboot|reboot-time <TIME>|staggered-reboot|upgrade-time <TIME>}

Parameters
- device-upgrade <MAC/HOSTNAME> {no-reboot|reboot-time <TIME>|upgrade-time <TIME> {no-reboot|reboot-time <TIME>}}

<table>
<thead>
<tr>
<th>&lt;MAC/HOSTNAME&gt;</th>
<th>Upgrades firmware on the device identified by the &lt;MAC/HOSTNAME&gt; keyword</th>
</tr>
</thead>
<tbody>
<tr>
<td>no-reboot</td>
<td>Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)</td>
</tr>
<tr>
<td>reboot-time &lt;TIME&gt;</td>
<td>Optional. Schedules an automatic reboot after a successful upgrade</td>
</tr>
<tr>
<td>upgrade-time &lt;TIME&gt;</td>
<td>Optional. Schedules an automatic device firmware upgrade on a specified day and time</td>
</tr>
</tbody>
</table>

- device-upgrade all {force|no-reboot|reboot-time <TIME>|upgrade-time <TIME> {no-reboot|reboot-time <TIME>}} {(staggered-reboot)}

<table>
<thead>
<tr>
<th>all</th>
<th>Upgrades firmware on all devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>force</td>
<td>Optional. Select this option to force upgrade on the selected device(s). When selected, the devices are upgraded even if they have the same firmware as the upgrading access point, wireless controller, or service platform. If forcing a device upgrade, optionally specify any one of the following options: no-reboot, reboot-time, upgrade-time, or staggered-reboot.</td>
</tr>
<tr>
<td>no-reboot</td>
<td>Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)</td>
</tr>
<tr>
<td>reboot-time &lt;TIME&gt;</td>
<td>Optional. Schedules an automatic reboot after a successful upgrade</td>
</tr>
<tr>
<td>upgrade-time &lt;TIME&gt;</td>
<td>Optional. Schedules an automatic device firmware upgrade on all devices on a specified day and time</td>
</tr>
</tbody>
</table>

- staggered-reboot | This keyword is recursive and common to all of the above. |
|                   | Optional. Enables staggered device reboot (one at a time) without network impact |
### DEVICE-UPGRADE COMMAND

**device-upgrade** `<DEVICE-TYPE>` *all*

- **Upgrades firmware on all devices of a specific type.** Select the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, VX9000.

- **After selecting the device type, schedule an automatic upgrade and/or an automatic reboot.**

**force**

- **Optional.** Select this option to force upgrade on the selected device(s). When selected, the devices are upgraded even if they have the same firmware as the upgrading access point, wireless controller, or service platform. If forcing a device upgrade, optionally specify any one of the following options: no-reboot, reboot-time, upgrade-time, or staggered-reboot.

**no-reboot**

- **Optional.** Disables automatic reboot after a successful upgrade (the device must be manually restarted)

**reboot-time** `<TIME>`

- **Optional.** Schedules an automatic reboot after a successful upgrade
  
  - `<TIME>` – Optional. Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format.

**upgrade-time** `<TIME>`

- **Optional.** Schedules an automatic firmware upgrade on all devices, of the specified type, on a specified day and time
  
  - `<TIME>` – Specify the upgrade time in the MM/DD/YYYY-HH:MM or HH:MM format.

**staggered-reboot**

- **This keyword is recursive and common to all of the above.**
  
  - Optional. Enables staggered device reboot (one at a time) without network impact

### CANCEL-UPGRADE COMMAND

**cancel-upgrade** `[<MAC/HOSTNAME>|all]` *all* `ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600|vx9000`

**on rf-domain** `[<RF-DOMAIN-NAME>|all]`

- **Cancels a scheduled firmware upgrade based on the parameters passed.** This command provides the following options to cancel scheduled firmware upgrades:
  
  - Cancels upgrade on specific device(s). The devices are identified by their MAC addresses or hostnames.
  - Cancels upgrade on all devices within the network
  - Cancels upgrade on all devices of a specific type. Specify the device type.
  - Cancels upgrade on specific device(s) or all device(s) within a specific RF Domain or all RF Domains. Specify the RF Domain name.

**cancel-upgrade** `[<MAC/HOSTNAME>|all]`

- **Cancels a scheduled firmware upgrade on a specified device or on all devices**
  
  - `<MAC/HOSTNAME>` – Cancels a scheduled upgrade on the device identified by the `<MAC/HOSTNAME>` keyword. Specify the device’s MAC address or hostname.
  - `all` – Cancels scheduled upgrade on all devices
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cancel-upgrade &lt;DEVICE-TYPE&gt; all</td>
<td>Cancels scheduled firmware upgrade on all devices of a specific type. Select the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, VX9000.</td>
</tr>
<tr>
<td>cancel-upgrade on rf-domain [&lt;RF-DOMAIN-NAME&gt;]</td>
<td>Cancels scheduled firmware upgrade on all devices in a specified RF Domain or all RF Domains.</td>
</tr>
<tr>
<td>• device-upgrade load-image [ap621</td>
<td>ap622</td>
</tr>
<tr>
<td>load-image &lt;DEVICE-TYPE&gt;</td>
<td>Loads device firmware image from a specified location. Use this command to specify the device type and the location of the corresponding image file.</td>
</tr>
<tr>
<td>• &lt;DEVICE-TYPE&gt;</td>
<td>Specify the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, VX9000.</td>
</tr>
<tr>
<td>&lt;IMAGE-URL&gt;</td>
<td>Specify the device’s firmware image location in one of the following formats: IPv4 URLs: tftp://&lt;hostname&gt;</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Specify the name of the device or RF Domain. The image, of the specified device type is loaded from the device specified here. In case of an RF Domain, the image available on the RF Domain manager is loaded.</td>
</tr>
<tr>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>
**device-upgrade rf-domain** [<RF-DOMAIN-NAME>|all|containing <WORD>|filter location <WORD>] [ap621|ap622|ap650|ap651|ap652|ap6522|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45XX|nx5500|nx65XX|nx75xx|nx9000|nx9600|vx9000] {(<MAC/HOSTNAME>|force|from-controller|no-reboot|reboot-time <TIME>|staggered-reboot|upgrade-time <TIME>)}

<table>
<thead>
<tr>
<th>rf-domain</th>
<th>Upgrades firmware on devices in a specified RF Domain or all RF Domains. Devices within a RF Domain are upgraded through the RF Domain manager.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;RF-DOMAIN-NAME&gt; – Upgrades devices in the RF Domain identified by the &lt;RF-DOMAIN-NAME&gt; keyword.</td>
</tr>
<tr>
<td></td>
<td>• &lt;RF-DOMAIN-NAME&gt; – Specify the RF Domain name.</td>
</tr>
<tr>
<td></td>
<td>• all – Upgrades devices across all RF Domains</td>
</tr>
<tr>
<td></td>
<td>• containing &lt;WORD&gt; – Filters RF Domains by their names. RF Domains with names containing the sub-string identified by the &lt;WORD&gt; keyword are filtered. Devices on the filtered RF Domains are upgraded.</td>
</tr>
<tr>
<td></td>
<td>• filter location &lt;WORD&gt; – Filters devices by their location. All devices with location matching the &lt;WORD&gt; keyword are upgraded.</td>
</tr>
</tbody>
</table>

| <DEVICE-TYPE> | After specifying the RF Domain, select the device type. The options are: AP621, AP622, AP650, AP651, AP652, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, RX45XX, RX5500, RX65XX, RX75XX, RX9000, RX9600, RX9000. |

| <MAC/HOSTNAME> | Optional. Use this option to identify specific devices for upgradation. Specify the device’s MAC address or hostname. The device should be within the specified RF Domain and of the specified device type. After identifying the devices to upgrade, configure any one of the following actions: force devices to upgrade, or initiate an upgrade through the adopting controller. |
|                | **Note:** If no MAC address or hostname is specified, all devices of the type selected are upgraded. |

| force | Optional. Select this option to force upgrade for the selected device(s). When selected, the devices are upgraded even if they have the same firmware as the upgrading access point, wireless controller, or service platform. If forcing a device upgrade, optionally specify any one of the following options: no-reboot, reboot-time, upgrade-time, or reboot-time. |

| from-controller | Optional. Upgrades a device through the adopted device. If initiating an upgrade through the adopting controller, optionally specify any one of the following options: no-reboot, reboot-time, upgrade-time, or reboot-time. |

| no-reboot | Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted) |
| {staggered-reboot} | |

| reboot-time <TIME> | Optional. Schedules an automatic reboot after a successful upgrade. Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format. |
| {staggered-reboot} | |

| staggered-reboot | This keyword is common to all of the above. |
| Optional. Enables staggered reboot (one at a time) without network impact |

| upgrade-time <TIME> | Optional. Schedules an automatic firmware upgrade |
| {no-reboot} | |
| reboot-time <TIME>} | After a scheduled upgrade, the following actions can be performed. |
• no-reboot – Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)
• reboot-time <TIME> – Optional. Schedules an automatic reboot after a successful upgrade. Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format.

Usage Guidelines (NOC controller adoption matrix)
The following table displays NOC controllers and the corresponding site-level controllers supported by each:

<table>
<thead>
<tr>
<th>Site Controllers supported by each NOC controller</th>
<th>RFS7000</th>
<th>NX9000</th>
<th>NX95XX (NX9500 &amp; NX9510)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFS4000</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>RFS6000</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>RFS7000</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NX45XX</td>
<td>-</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NX65XX</td>
<td>-</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NX7500</td>
<td>-</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NX9000</td>
<td>-</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>NX95XX</td>
<td>-</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>

Examples
rfs7000-6DCD4B>show wireless ap configured

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap7131-11E6C4</td>
<td>00-23-68-11-E6-C4</td>
<td>default-ap71xx</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap8132-711728</td>
<td>B4-C7-99-71-17-28</td>
<td>default-ap81xx</td>
<td>default</td>
<td>00-15-70-81-74-2D</td>
</tr>
<tr>
<td>3</td>
<td>ap81xx-74B45C</td>
<td>B4-C7-99-74-B4-5C</td>
<td>default-ap81xx</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B>

rfs7000-6DCD4B>device-upgrade ap8132-711728

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4-C7-99-6D-CD-4B</td>
<td>Success</td>
<td>Queued 1 devices to upgrade</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B>

rfs7000-6DCD4B>show device-upgrade status
Number of devices currently being upgraded : 1
Number of devices waiting in queue to be upgraded : 0
Number of devices currently being rebooted : 0
Number of devices waiting in queue to be rebooted : 0
Number of devices failed upgrade : 0

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>STATE</th>
<th>UPGRADE TIME</th>
<th>REBOOT TIME</th>
<th>PROGRESS</th>
<th>RETRIES</th>
<th>LAST UPDATE ERROR</th>
<th>UPGRADED BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap8132-711728</td>
<td>downloading</td>
<td>immediate</td>
<td>immediate</td>
<td>8</td>
<td>0</td>
<td>-</td>
<td>rfs6000-81742D</td>
</tr>
<tr>
<td>rfs6000-81742D</td>
<td>upgrading-devices</td>
<td>immediate</td>
<td>immediate</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>rfs6000-81742D</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B>
rfs7000-6DCD4B> show device-upgrade ?
  history          History of Device Upgrade
  load-image-status Status of firmware file download on the device
  status           Status of Device Upgrade
  versions         Versions of device-upgrade images

rfs7000-6DCD4B>

rfs7000-6DCD4B> show device-upgrade history
+---------------------------------------------------------------------+
| Device     | RESULT | TIME            | RETRIES | UPGRADED-BY LAST-UPDATE-ERROR |
+---------------------------------------------------------------------+
| rfs6000-81742D | done   | 2016-02-04 03:37:11 | 0        | rfs7000-6DCD4B -              |
| rfs6000-81742D | done   | 2015-01-05 05:35:53 | 0        | rfs7000-6DCD4B -              |
| rfs6000-81742D | failed | 2014-09-28 23:25:45 | 3        | rfs7000-6DCD4B Reboot failed   |
| rfs6000-81742D | done   | 2014-11-30 21:54:11 | 0        | rfs7000-6DCD4B -              |
+---------------------------------------------------------------------+

rfs7000-6DCD4B> show device-upgrade versions
+---------------------------------------------------+
| CONTROLLER | DEVICE-TYPE | VERSION |
+---------------------------------------------------+
| rfs7000-6DCD4B | ap621       | 5.8.4.0-008D |
| rfs7000-6DCD4B | ap622       | 5.8.4.0-008D |
| rfs7000-6DCD4B | ap650       | 5.8.4.0-008D |
| rfs7000-6DCD4B | ap6511      | none       |
| rfs7000-6DCD4B | ap6521      | 5.8.4.0-008D |
| rfs7000-6DCD4B | ap6522      | 5.8.4.0-008D |
| rfs7000-6DCD4B | ap6532      | 5.8.4.0-008D |
| rfs7000-6DCD4B | ap6562      | 5.8.4.0-008D |
| rfs7000-6DCD4B | ap71xx      | none       |
| rfs7000-6DCD4B | ap7502      | none       |
| rfs7000-6DCD4B | ap7522      | none       |
| rfs7000-6DCD4B | ap7532      | none       |
| rfs7000-6DCD4B | ap7562      | none       |
| rfs7000-6DCD4B | ap81xx      | 5.8.4.0-007D |
| rfs7000-6DCD4B | ap82xx      | none       |
| rfs7000-6DCD4B | ap8432      | none       |
| rfs7000-6DCD4B | ap8533      | none       |
| rfs7000-6DCD4B | rfs4000     | none       |
| rfs7000-6DCD4B | rfs6000     | 5.8.4.0-007D |
| rfs7000-6DCD4B | rfs7000     | none       |
+---------------------------------------------------+

The following example shows two devices, in the RF domain 'TechPubs' that are adopted to the same controller:

rfs6000-6DB5D4> show wireless ap on TechPubs
+---------------------------------------------------+
| MODE       | radio modes - W = WLAN, S=Sensor, ' ' (Space) = radio not present |
+---------------------------------------------------+
| AP-NAME    | AP-LOCATION | RF-DOMAIN | AP-MAC | #RADIOS | MODE | CLIENT | IPv4        | IPv6       |
+---------------------------------------------------+
| ap6522-43C78C | TechPubs.. | B4-C7-99-43-C7-8C | 2 | W-W   | 0 | 192.168.13.136 :: |
| ap6522-57F674 | TechPubs.. | B4-C7-99-57-F6-74 | 2 | W-W   | 0 | 192.168.13.214 :: |
+---------------------------------------------------+

Total number of APs displayed: 2

rfs6000-6DB5D4>
Both APs and the controller are running the same image. Therefore, the device-upgrade command fails. This is shown in the following example:

```
$rfs6000-6DB5D4>device-upgrade rf-domain TechPubs ap6522
In progress ....
---------------------------------------------------------------------------------------
CONTROLLER     STATUS                              MESSAGE
---------------------------------------------------------------------------------------
B4-C7-99-6D-B5-D4   Fail    TechPubs(Upgrade not required in TechPubs)
---------------------------------------------------------------------------------------
$rfs6000-6DB5D4>
```

Use the ‘force’ parameter to forcefully upgrade the APs.

```
rfs6000-6DB5D4>device-upgrade rf-domain TechPubs ap6522 force
In progress ....
---------------------------------------------------------------------------------------
CONTROLLER     STATUS                              MESSAGE
---------------------------------------------------------------------------------------
B4-C7-99-6D-B5-D4   Success    TechPubs(device type(s) ap6522 added for upgrade),
---------------------------------------------------------------------------------------
```

```
rfs6000-6DB5D4>show device-upgrade status
Number of devices currently being upgraded : 0
Number of devices waiting in queue to be upgraded : 2
Number of devices currently being rebooted : 0
Number of devices waiting in queue to be rebooted : 0
---------------------------------------------------------------------------------------
DEVICE    STATE  UPGRADE TIME REBOOT TIME PROGRESS RETRIES LAST UPDATE  ERROR   UPGRADED BY
---------------------------------------------------------------------------------------
ap6522-43C78C   waiting   immediate    immediate   0        0       -          rfs6000-6DB5D4
ap6522-57F674   waiting   immediate    immediate   0        0       -          rfs6000-6DB5D4
---------------------------------------------------------------------------------------
```

The following examples show the upgradation of devices in a HM network.

The HM setup is as follows:

```
rfs7000-6DCD4B (NOC) > l3-adoption > rfs6000-81701D (SITE-CONTROLLER) > l2-adoption > ap8132-711728 (access point)
```

Step 1: Load AP81XX firmware on the NOC (rfs7000-6DCD4B):

```
rfs7000-6DCD4B>device-upgrade load-image ap81XX
ftp://anonymous:anonymous@192.168.13.10/LatestBuilds/W583/AP81XX-012D.img
--------------------------------------------------------------------------------
CONTROLLER          STATUS                      MESSAGE
--------------------------------------------------------------------------------
rfs7000-6DCD4B        Success    Successfully initiated load image
--------------------------------------------------------------------------------
rfs7000-6DCD4B>
```

```
rfs7000-6DCD4B>show device-upgrade load-image-status
Download of ap81xx firmware file is complete
rfs7000-6DCD4B>
```
Step 2: Execute the upgrade command on the NOC. This pushes the AP81XX image through the Site Controller on to the adopted AP81XX (ap8132-711728).

```bash
rfs7000-6DCD4B>device-upgrade ap8132-711728
```

```
+-----------------+-----------------+------------------+
| CONTROLLER      | STATUS          | MESSAGE         |
+-----------------+-----------------+------------------+
| B4-C7-99-6D-CD-4B | Success         | Queued 1 devices to upgrade |
+-----------------+-----------------+------------------+
```

```bash
rfs7000-6DCD4B>show device-upgrade status
```

**Number of devices currently being upgraded : 1**  
Number of devices waiting in queue to be upgraded : 0  
Number of devices currently being rebooted : 0  
Number of devices waiting in queue to be rebooted : 0

```
+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+
| DEVICE          | STATE           | UPGRADE TIME    | REBOOT TIME    | PROGRESS        | RETRIES | LAST UPDATE    |
+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+
| ap8132-711728   | downloading     | immediate       | immediate      | 25              | 0        | -              |
| rfs6000-81701D  | upgrading-devices | immediate   | immediate | 0              | 0        | -              |
+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+
```

```bash
rfs7000-6DCD4B>
```
2.1.14 disable

User Exec Commands

This command can be executed in the Priv Exec Mode only. This command turns off (disables) the privileged mode command set and returns to the User Executable Mode. The prompt changes from rfs7000-37FABE# to rfs7000-37FABE>

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
disable

Parameters
None

Examples
rfs7000-37FABE#disable
rfs7000-37FABE>
2.1.15 enable

User Exec Commands

Turns on (enables) the privileged mode command set. The prompt changes from rfs7000-37FABE> to rfs7000-37FABE#. This command does not do anything in the Privilege Executable mode.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

enable

Parameters

None

Examples

rfs7000-37FABE>enable
rfs7000-37FABE#
2.1.16 file-sync

User Exec Commands

Syncs EAP-TLS X.509 (PKCS#12) certificate between the staging-controller and adoptee AP6522/AP6562 client-bridge access points. Use this command to configure parameters that enable syncing of PKCS#12 certificate.

When enabling file syncing, consider the following points:

• The X.509 certificate needs synchronization only if the access point's radio2, the client-bridge radio, is configured to use EAP-TLS authentication
• Execute the command on the controller adopting the access point
• Ensure that the X.509 certificate file is installed on the controller
• If the adopting device is a site controller with layer 3 adoption to the NOC, ensure that the X.509 certificate is synced across the hierarchically managed setup – between the NOC, site-controller (the staging-controller), and the client-bridge access points.

Syncing of wireless client-bridge certificate can be automated. To automate file syncing, in the controller's device/profile configuration mode, execute the following command: `file-sync [auto]count <1-20>`. For more information, see `file-sync`

For more information on configuring a AP client-bridge, see `bridge`

Supported in the following platforms:

• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
file-sync [cancel|load-file|trustpoint|wireless-bridge]
file-sync cancel wireless-bridge [DEVICE-NAME|all|rf-domain [DOMAIN-NAME|all]]
file-sync load-file [trustpoint TRUSTPOINT-NAME|wireless-bridge] URL
file-sync trustpoint TRUSTPOINT-NAME [DEVICE-NAME|all|rf-domain [DOMAIN-NAME|all]
  {from-controller} {reset-radio|upload-time <TIME>}
file-sync wireless-bridge [DEVICE-NAME|all|rf-domain [DOMAIN-NAME|all]
  {from-controller} {reset-radio|upload-time <TIME>}
```

Parameters

- `file-sync cancel wireless-bridge [DEVICE-NAME|all|rf-domain [DOMAIN-NAME|all]]`
  - Cancels scheduled wireless client-bridge certificate synchronization on a specified AP, or all APs, or APs within an RF Domain
    - `<DEVICE-NAME>` – Cancels scheduled certificate synchronization on the AP identified by the `<DEVICE-NAME>` parameter. Specify the AP's hostname or MAC address.
    - `all` – Cancels scheduled certificate synchronization on all APs
    - `rf-domain [DOMAIN-NAME|all]` – Cancels scheduled certificate synchronization on all APs in a specified RF Domain or in all RF Domains
    - `<DOMAIN-NAME>` – Cancels scheduled certificate synchronization on all APs within the RF Domain identified by the `<DOMAIN-NAME>` parameter. Specify the RF Domain's name.
    - `all` – Cancels scheduled certificate synchronization on all RF Domains
- `file-sync load-file wireless-bridge <URL>`

  Loads the client-bridge certificate to the staging controller. Use this command to load the certificate to the controller before scheduling or initiating a certificate synchronization.

  - `<URL>` – Provide the certificate location using one of the following formats:
    - `tftp://<hostname|IP>[:port]/path/file`
    - `ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file`
    - `sftp://<user>:<passwd>@<hostname|IP>[:port]/path/file`
    - `http://<hostname|IP>[:port]/path/file`
    - `cf:/path/file`
    - `usb<n>:/path/file`

  **Note:** Both IPv4 and IPv6 address types are supported.

- `file-sync trustpoint <TRUSTPOINT-NAME> [ <DEVICE-NAME>|all|rf-domain [ <DOMAIN-NAME>|all ] from-controller ] { reset-radio|upload-time <TIME> }`

  Configures file-syncing parameters

  - `trustpoint <TRUSTPOINT-NAME>` – Enables syncing of a specified trustpoint between controller and its adopted devices
  - `<TRUSTPOINT-NAME>` – Specify the trustpoint name.

  These file-sync options can be applied to a specified AP, all APs, or all APs within a specified RF Domain or on all RF Domains.

  After specifying the trustpoint name, configures the following file-sync parameters:

  - `<DEVICE-NAME>` – Applies these parameters to the AP identified by the `<DEVICE-NAME>` parameter. Specify the AP's hostname or MAC address.
  - `all` – Applies these parameters to all APs
  - `rf-domain [ <DOMAIN-NAME>|all ] from-controller` – Applies these parameters to all APs in a specified RF Domain or in all RF Domains
    - `<DOMAIN-NAME>` – Select to apply to APs within the RF Domain identified by the `<DOMAIN-NAME>` parameter. Specify the RF Domain's name.
    - `all` – Select to apply these parameters to APs in all RF Domains
    - `from-controller` – Optional. Loads certificate to the APs from the adopting controller and not the RF Domain manager

  After specify the access points, specify the following options: `reset-radio` and `upload-time`.

- `reset-radio`

  This keyword is recursive and applicable to all of the above parameters.

  Optional. Resets the radio after file synchronization. Reset the radio in case the certificate is renewed along with no changes made to the 'bridge EAP username' and 'bridge EAP password'.

- `upload-time <TIME>`

  This keyword is recursive and applicable to all of the above parameters.

  - `upload-time` – Optional. Schedules certificate upload at a specified time
    - `<TIME>` – Specify the time in the MM/DD/YYYY-HH:MM or HH:MM format. If no time is configured, the process is initiated as soon as the command is executed.
- **file-sync wireless-bridge** 
  
  - `<DEVICE-NAME>`: Applies these parameters to the AP identified by the `<DEVICE-NAME>` parameter. Specify the AP's hostname or MAC address.
  - `all`: Applies these parameters to all APs
  - `rf-domain [ <DOMAIN-NAME> | all ]`: Applies these parameters to all APs in a specified RF Domain or in all RF Domains.
    - `<DOMAIN-NAME>`: Select to apply to APs within the RF Domain identified by the `<DOMAIN-NAME>` parameter. Specify the RF Domain's name.
    - `all`: Select to apply these parameters to all APs in all RF Domains
  - `from-controller`: Optional. Loads certificate to the APs from the adopting controller and not the RF Domain manager

After specifying the access points to load certificates, specify the following options: `reset-radio` and `upload-time`.

- **reset-radio**: This keyword is recursive and applicable to all of the above parameters. Optional. Resets the radio after file synchronization. Reset the radio in case the certificate is renewed along with no changes made to the 'bridge EAP username' and 'bridge EAP password'.

- **upload-time <TIME>**: This keyword is recursive and applicable to all of the above parameters. Optional. Schedules certificate upload at a specified time.
  - `<TIME>`: Specify the time in the `MM/DD/YYYY-HH:MM` or `HH:MM` format. If no time is configured, the process is initiated as soon as the command is executed.

### Examples

**rfs7000-6DCD4B>** file-sync wireless-bridge ap7131-11E6C4 upload-time 12/12/2015-12:30

```
+-----------------+---------------------+-------------------------------------+-------------------------------------+-------------------------------------+
| CONTROLLER      | STATUS              | MESSAGE                            | MESSAGE                            |
|-----------------|---------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| B4-C7-99-6D-CD-4B | Success            | Queued 1 APs to upload             |                                     |
```

**rfs7000-6DCD4B>

The following uploads certificate to all access points:

**rfs6000-6DB5D4>** file-sync wireless-bridge all upload-time 06/05/2015-23:42

**rfs6000-6DB5D4>**
### 2.1.17 join-cluster

**User Exec Commands**

Adds a device (access point, wireless controller, or service platform), as a member, to an existing cluster of devices. Assign a static IP address to the device before adding to a cluster.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
join-cluster <IP> user <USERNAME> password <WORD> {level|mode}
join-cluster <IP> user <USERNAME> password <WORD> {level [1|2]|mode [active|standby]}
```

**Parameters**

- `join-cluster <IP> user <USERNAME> password <WORD> {level [1|2]|mode [active|standby]}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;IP&gt;</code></td>
<td>Specify the cluster member’s IP address.</td>
</tr>
<tr>
<td>user <code>&lt;USERNAME&gt;</code></td>
<td>Specify a user account with super user privileges on the new cluster member</td>
</tr>
<tr>
<td>password <code>&lt;WORD&gt;</code></td>
<td>Specify password for the account specified in the user parameter</td>
</tr>
<tr>
<td>level [1</td>
<td>2]</td>
</tr>
<tr>
<td></td>
<td>• 1 – Configures level 1 routing</td>
</tr>
<tr>
<td></td>
<td>• 2 – Configures level 2 routing</td>
</tr>
<tr>
<td>mode [active</td>
<td>standby]</td>
</tr>
<tr>
<td></td>
<td>• active – Configures this cluster as active</td>
</tr>
<tr>
<td></td>
<td>• standby – Configures this cluster to be on standby mode</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

To add a device to an existing cluster:
- Configure a static IP address on the device (access point, wireless controller, or service platform).
- Provide username and password for superuser, network admin, system admin, or operator accounts.

After adding the device to a cluster, execute the “write memory” command to ensure the configuration persists across reboots.

**Examples**

```
rfs7000-37FABE>join-cluster 192.168.13.15 user admin password superuser level 1 mode standby
... connecting to 192.168.13.15
... applying cluster configuration
... committing the changes
... saving the changes
[OK]
rfs7000-37FABE>
```
rfs7000-37FABE>show context
!
! Configuration of RFS7000 version 5.8.0-008D
!
! version 2.5
!
............................................................
interface vlan1
  ip address 192.168.13.15/24
  no ipv6 enable
  no ipv6 request-dhcpv6-options
cluster name TechPubs
cluster mode standby
cluster member ip 192.168.13.15
logging on
logging console warnings
logging buffered warnings
!
!
end
rfs7000-37FABE>

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>cluster</code></td>
<td>Initiates cluster context. The cluster context enables centralized management and configuration of all cluster members from any one member.</td>
</tr>
<tr>
<td><code>create-cluster</code></td>
<td>Creates a new cluster on a specified device</td>
</tr>
</tbody>
</table>
### 2.1.18 l2tpv3

#### User Exec Commands

Establishes or brings down an *Layer 2 Tunnel Protocol Version 3* (L2TPV3) tunnel

Supported in the following platforms:
- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

- `l2tpv3 tunnel [〈TUNNEL-NAME〉|all]`
- `l2tpv3 tunnel 〈TUNNEL-NAME〉 [down|up] {on 〈DEVICE-NAME〉}
- `l2tpv3 tunnel 〈TUNNEL-NAME〉 session 〈SESSION-NAME〉 [down|up] {on 〈DEVICE-NAME〉}
- `l2tpv3 tunnel all [down|up] {on 〈DEVICE-NAME〉}

#### Parameters

- **l2tpv3 tunnel 〈TUNNEL-NAME〉 [down|up] {on 〈DEVICE-NAME〉}**

<table>
<thead>
<tr>
<th>l2tpv3 tunnel</th>
<th>Establishes or brings down L2TPv3 tunnels</th>
</tr>
</thead>
<tbody>
<tr>
<td>〈TUNNEL-NAME〉 [down</td>
<td>up]</td>
</tr>
<tr>
<td></td>
<td>• down – Brings down the specified tunnel</td>
</tr>
<tr>
<td></td>
<td>• up – Establishes the specified tunnel</td>
</tr>
<tr>
<td>on 〈DEVICE-NAME〉</td>
<td>Optional. Establishes or brings down a tunnel on a specified device</td>
</tr>
<tr>
<td></td>
<td>• 〈DEVICE-NAME〉 – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

- **l2tpv3 tunnel 〈TUNNEL-NAME〉 session 〈SESSION-NAME〉 [down|up] {on 〈DEVICE-NAME〉}**

<table>
<thead>
<tr>
<th>l2tpv3 tunnel</th>
<th>Establishes or brings down L2TPv3 tunnels</th>
</tr>
</thead>
<tbody>
<tr>
<td>〈TUNNEL-NAME〉 [session 〈SESSION-NAME〉] [down</td>
<td>up]</td>
</tr>
<tr>
<td></td>
<td>• 〈TUNNEL-NAME〉 – Specify the tunnel name.</td>
</tr>
<tr>
<td></td>
<td>• session 〈SESSION-NAME〉 – Identifies a specific session</td>
</tr>
<tr>
<td></td>
<td>• 〈SESSION-NAME〉 – Specify the session name.</td>
</tr>
<tr>
<td></td>
<td>• down – Brings down the session identified by the 〈SESSION-NAME〉 keyword</td>
</tr>
<tr>
<td></td>
<td>• up – Establishes the session identified by the 〈SESSION-NAME〉 keyword</td>
</tr>
<tr>
<td>on 〈DEVICE-NAME〉</td>
<td>Optional. Establishes or brings down a tunnel session on a specified device</td>
</tr>
<tr>
<td></td>
<td>• 〈DEVICE-NAME〉 – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

- **l2tpv3 tunnel all [down|up] {on 〈DEVICE-NAME〉}**

<table>
<thead>
<tr>
<th>l2tpv3 tunnel</th>
<th>Establishes or brings down L2TPv3 tunnels</th>
</tr>
</thead>
<tbody>
<tr>
<td>all [down</td>
<td>up]</td>
</tr>
<tr>
<td></td>
<td>• down – Brings down all tunnels</td>
</tr>
<tr>
<td></td>
<td>• up – Establishes all tunnels</td>
</tr>
<tr>
<td>Optional. Establishes or brings down all tunnels on a specified device</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE>l2tpv3 tunnel Tunnell session TunnellSession1 up on rfs7000-37FABE
```

**NOTE:** For more information on the L2TPv3 tunnel configuration mode and commands, see *Chapter 22, L2TPV3-POLICY*. 
2.1.19 logging

User Exec Commands

Modifies message logging settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

logging monitor {<0-7>|alerts|critical|debugging|emergencies|errors|informational|notifications|warnings}

Parameters

- logging monitor {<0-7>|alerts|critical|debugging|emergencies|errors|informational|notifications|warnings}

Examples

rfs7000-6DCD4B(config-device-B4-C7-99-6D-CD-4B)#logging on
rfs7000-6DCD4B>logging monitor debugging
rfs7000-6DCD4B>show logging

Logging module: enabled
Aggregation time: disabled
Console logging: level debugging
Monitor logging: disabled
Buffered logging: level warnings
Syslog logging: level warnings
Facility: local7

Log Buffer (103 bytes):

May 17 22:03:53 2015: rfs7000-6DCD4B : %SYSTEM-3-LOGIN_FAIL: Log-in failed for user 'admin' from 'ssh'
rfs7000-6DCD4B>
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets terminal lines logging levels</td>
</tr>
</tbody>
</table>
2.1.20 mint

User Exec Commands

Uses MiNT protocol to perform a ping and traceroute to a remote device

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

mint [ping|traceroute]
mint ping <MINT-ID> {(count <1-10000>|size <1-64000>|timeout <1-10>)}
mint traceroute <MINT-ID> {(destination-port <1-65535>|max-hops <1-255>|source-port <1-65535>|timeout <1-255>)}

Parameters

- ping <MINT-ID> Sends a MiNT echo message to a specified destination
  - <MINT-ID> – Specify the destination device’s MiNT ID.
- count <1-10000> Optional. Sets the pings to the MiNT destination
  - <1-10000> – Specify a value from 1 - 10000. The default is 3.
- size <1-64000> Optional. Sets the MiNT payload size in bytes
  - <1-64000> – Specify a value from 1 - 64000 bytes. The default is 64 bytes.
- timeout <1-10> Optional. Sets a response time in seconds
  - <1-10> – Specify a value from 1 sec - 10 sec. The default is 1 second.

- traceroute <MINT-ID> Prints the route packets trace to a device
  - <MINT-ID> – Specify the destination device’s MiNT ID.
- destination-port <1-65535> Optional. Sets the Equal-cost Multi-path (ECMP) routing destination port
  - <1-65535> – Specify a value from 1 - 65535. The default port is 45.
- max-hops <1-255> Optional. Sets the maximum number of hops a traceroute packet traverses in the forward direction
  - <1-255> – Specify a value from 1 - 255. The default is 30.
- source-port <1-65535> Optional. Sets the ECMP source port
  - <1-65535> – Specify a value from 1 - 65535. The default port is 45.
- timeout <1-255> Optional. Sets the minimum response time period in seconds
  - <1-255> – Specify a value from 1 sec - 255 sec. The default is 30 seconds.
Examples

rfs7000-37FABE>mint ping 68.22.9D.58 count 5 size 120
MiNT ping 68.22.9D.58 with 120 bytes of data.
Response from 68.22.9D.58: id=1 time=0.341 ms
Response from 68.22.9D.58: id=2 time=0.313 ms
Response from 68.22.9D.58: id=3 time=0.314 ms
Response from 68.22.9D.58: id=4 time=0.333 ms
Response from 68.22.9D.58: id=5 time=0.291 ms

--- 68.22.9D.58 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 0.291/0.318/0.341 ms
rfs7000-37FABE>
2.1.21 no

User Exec Commands

Use the `no` command to revert a command or to set parameters to their default. This command turns off an enabled feature or reverts settings to default.

**NOTE:** The commands have their own set of parameters that can be reset.

Supported in the following platforms:
- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```markdown
no [adoption|captive-portal|crypto|debug|logging|page|service|terminal|virtual-machine|wireless]
```

```markdown
no adoption {on <DEVICE-OR-DOMAIN-NAME>}
```

**NOTE:** The `no > adoption` command resets the adoption state of a specified device (and all devices adopted to it) or devices within a specified RF Domain. When executed without specifying the device or RF Domain, the command resets the adoption state of the logged device and all devices, if any, adopted to it.

```markdown
no captive-portal client [captive-portal <CAPTIVE-PORTAL-NAME>|mac <MAC>] {on <DEVICE-OR-DOMAIN-NAME>}
```

```markdown
no crypto pki [server|trustpoint]
no crypto pki [server|trustpoint] <TRUSTPOINT-NAME> {del-key {on <DEVICE-NAME>} | on <DEVICE-NAME>}
```

```markdown
no logging monitor
```

```markdown
no page
```

```markdown
no service [block-adopter-config-update|locator|snmp|ssm|wireless]
```

```markdown
no service snmp sysoid wing5
```

```markdown
no service block-adopter-config-update
```

```markdown
no service ssm trace pattern {<WORD>} {on <DEVICE-NAME>}
```

```markdown
no service wireless [trace pattern {<WORD>} {on <DEVICE-NAME>}]|unsanctioned ap
air-terminate <BSSID> {on <DOMAIN-NAME>}
```

```markdown
no service locator {on <DEVICE-NAME>}
```

```markdown
no terminal [length|width]
```

```markdown
no virtual-machine assign-usb-ports {on <DEVICE-NAME>}
```

```markdown
no wireless client [all|<MAC>]
```

```markdown
no wireless client all {filter|on}
```

```markdown
no wireless client all {filter [wlan <WLAN-NAME>]}
```
no wireless client all {on <DEVICE-OR-DOMAIN-NAME>} {filter [wlan <WLAN-NAME>]}
no wireless client mac <MAC> {on <DEVICE-OR-DOMAIN-NAME>}

Parameters
- no <PARAMETERS>

| no <PARAMETERS> | Resets or reverts settings based on the parameters passed |

Usage Guidelines
The `no` command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

Examples
rfs7000-37FABE>no adoption
rfs7000-37FABE>no page
2.1.22 on

User Exec Commands

Executes the following commands in the RF Domain context: clrscr, do, end, exit, help, service, and show

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
on rf-domain [RF-DOMAIN-NAME]|all]```

Parameters

- on rf-domain [RF-DOMAIN-NAME]|all]

| on rf-domain [RF-DOMAIN-NAME]|all] | Enters the RF Domain context based on the parameter specified |
|-------------------------------|------------------------------------------------------------|
| [RF-DOMAIN-NAME]|all] | • <RF-DOMAIN-NAME> – Specify the RF Domain name. Enters the specified RF Domain context. |
| [RF-DOMAIN-NAME]|all] | • all – Specifies all RF Domains. |

Examples

```
nx9500-6C8809(rf-domain-all)>?
on RF-Domain Mode commands:
    clrscr  Clears the display screen
    do  Run commands from Exec mode
    end  End current mode and change to EXEC mode
    exit  End current mode and down to previous mode
    help  Description of the interactive help system
    service  Service Commands
    show  Show running system information

nx9500-6C8809(rf-domain-all)>```
### 2.1.23 opendns

Retrieves the OpenDNS device-id from the OpenDNS site

This command integrates access points and controllers with OpenDNS. It obtains the device-id (16 character hex-string) from OpenDNS. This device-id is configured under all WLANs that are to be OpenDNS enabled. When configured and enabled on a WLAN, DNS queries from all wireless clients on the WLAN are redirected to OpenDNS (208.67.220.220 or 208.67.222.222) resolvers. These OpenDNS resolvers act as proxy DNS servers, and also provide additional features, such as Web filtering, performance improvements, etc.

**Syntax**

`opendns username <USERNAME> password <OPENDNS-PSWD> label <LABEL>`

**Parameters**

- **username**
  
  Configures the OpenDNS user name (should be valid username registered with OpenDNS)
  
  - `<USERNAME>` – Provide the OpenDNS user name.

- **password**
  
  Configures the password associated with the user configured in the previous step
  
  - `<OPENDNS-PSWD>` – Provide the OpenDNS password for the user.

- **label**
  
  Configures the network label. This the label (the user friendly name) of your network, and should be the same as the label (name) configured on the OpenDNS portal.
  
  - `<LABEL>` – Specify your OpenDNS server label.
  
  **Note:** For every unique set of username, password, and label only one device-id is returned. Apply this device-id in WLANs that are to be OpenDNS enabled. For information on configuring the device-id in the WLAN context, see `opendns`.

**Supported in the following platforms:**

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**NOTE:**

OpenDNS is a free, alternative DNS service that is faster and more reliable than other DNS services available. OpenDNS enables swift navigation of the Web without the outages that are frequent in other ISP provided DNS services. It also blocks inappropriate Web sites, phishing sites, and prevents virus and malware attacks.

**NOTE:**

The ‘username’ and ‘password’ values passed in this command should be pre-registered with the OpenDNS site. The ‘label’ can be any value. Only with a combination of a valid ‘username’, ‘password’, and any ‘label’ the OpenDNS server returns a device-id.
Usage Guidelines
Use your OpenDNS credentials to logon to the opendns.org site and use the labels, edit settings, and customize content filtering options to configure Web filtering settings.

Examples
ap7131-E6D512>opendns username bob@examplecompany.com password opendns label company_name
Connecting to OpenDNS server...
device_id = 0014AADF8EDC6C59
ap7131-E6D512>
2.1.24 page

- **User Exec Commands**

  Toggles a device’s paging function. Enabling this command displays the CLI command output page by page, instead of running the entire output at once.

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
page
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE>page
rfs7000-37FABE>
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables device paging</td>
</tr>
</tbody>
</table>
2.1.25 ping

User Exec Commands

Sends Internet Controller Message Protocol (ICMP) echo messages to a user-specified location.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
ping <IP/HOSTNAME> {count <1-10000>|dont-fragment {count|size}|size <1-64000>|source [<IP>|pppoe|vlan <1-4094>|wwan]}
```

Parameters

- `<IP/HOSTNAME>` Specify the destination IP address or hostname. When entered without any parameters, this command prompts for an IP address or a hostname.
- `count <1-10000>` Optional. Sets the pings to the specified destination.
  - `<1-10000>` – Specify a value from 1 - 10000. The default is 5.
- `dont-fragment {count|size}` Optional. Sets the don’t fragment bit in the ping packet. Packets with the dont-fragment bit specified are not fragmented. When a packet, with the dont-fragment bit specified, exceeds the specified maximum transmission unit (MTU) value, an error message is sent from the device trying to fragment it.
  - `count <1-10000>` – Optional. Sets the pings to the specified destination from 1 - 10000. The default is 5.
  - `size <1-64000>` – Optional. Sets the ping payload size from 1 - 64000 bytes. The default is 100 bytes.
- `size <1-64000>` Optional. Sets the ping payload size in bytes
  - `<1-64000>` – Specify the ping payload size from 1 - 64000. The default is 100 bytes.
- `source [<IP>|pppoe|vlan <1-4094]|wwan]` Optional. Sets the source address or interface name. This is the source of the ICMP packet to the specified destination.
  - `<IP>` – Specifies the source IP address
  - `pppoe` – Selects the PPP over Ethernet interface
  - `vlan <1-4094>` – Selects the VLAN interface from 1 - 4094
  - `wwan` – Selects the wireless WAN interface

Examples

```
rfs7000-37FABE>ping 172.16.10.4 count 6
PING 172.16.10.4 (172.16.10.4): 100 data bytes
108 bytes from 172.16.10.4: seq=0 ttl=64 time=0.851 ms
108 bytes from 172.16.10.4: seq=1 ttl=64 time=0.430 ms
108 bytes from 172.16.10.4: seq=2 ttl=64 time=0.509 ms
108 bytes from 172.16.10.4: seq=3 ttl=64 time=0.507 ms
108 bytes from 172.16.10.4: seq=4 ttl=64 time=0.407 ms
108 bytes from 172.16.10.4: seq=5 ttl=64 time=0.402 ms

--- 172.16.10.4 ping statistics ---
6 packets transmitted, 6 packets received, 0% packet loss
round-trip min/avg/max = 0.402/0.517/0.851 ms
rfs7000-37FABE>
```
rfs7000-6DCD4B> ping 10.2.0.99 source vlan 1
PING 10.2.0.99 (10.2.0.99) from 172.18.0.2 vlan1: 100(128) bytes of data.
108 bytes from 10.2.0.99: icmp_seq=1 ttl=63 time=1.09 ms
108 bytes from 10.2.0.99: icmp_seq=2 ttl=63 time=0.648 ms
108 bytes from 10.2.0.99: icmp_seq=3 ttl=63 time=0.735 ms
108 bytes from 10.2.0.99: icmp_seq=4 ttl=63 time=0.746 ms
108 bytes from 10.2.0.99: icmp_seq=5 ttl=63 time=0.732 ms

--- 10.2.0.99 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4001ms
rtt min/avg/max/mdev = 0.648/0.790/1.091/0.156 ms
rfs7000-6DCD4B>
2.1.26 ping6

User Exec Commands
Sends ICMPv6 echo messages to a user-specified IPv6 address

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
ping6 <IPv6/HOSTNAME> {<INTF-NAME>} {(count <1-10000>|size <1-64000>)}

Parameters
- ping <IPv6/HOSTNAME> {<INTF-NAME>} {(count <1-10000>|size <1-64000>)}

<table>
<thead>
<tr>
<th>&lt;IPv6/HOSTNAME&gt;</th>
<th>Specify the destination IPv6 address or hostname.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;INTF-NAME&gt;</td>
<td>Specify the interface name for link local/broadcast address</td>
</tr>
<tr>
<td>count &lt;1-10000&gt;</td>
<td>Optional. Sets the pings to the specified IPv6 destination</td>
</tr>
<tr>
<td>size &lt;1-64000&gt;</td>
<td>Optional. Sets the IPv6 ping payload size in bytes</td>
</tr>
</tbody>
</table>

Usage Guidelines
To configure a device’s IPv6 address, in the VLAN interface configuration mode, use the
ipv6 > address <IPv6-ADDRESS> command. After configuring the IPv6 address, use the ipv6 > enable command to enable IPv6. For more information, see ipv6.

Examples
rfs4000-1B3596(config-device-00-23-68-1B-35-96-if-ge4)#show ipv6 interface brief
- INTERFACE IP6 MODE IPV6-ADDRESS/MASK TYPE STATUS PROTOCOL
  - vlan1 True fe80::223:68ff:fe88:da7/64 Link-Local UP up
  - vlan1 True 2001:10:10:10:10:10:1/64 Global-Permanent UP up
  - vlan2 False UNASSIGNED None UP up
rfs4000-1B3596(config-device-00-23-68-1B-35-96-if-ge4)#

108 bytes from 2001:10:10:10:10:10:10:1: icmp_seq=1 ttl=64 time=0.401 ms
108 bytes from 2001:10:10:10:10:10:10:1: icmp_seq=2 ttl=64 time=0.311 ms
108 bytes from 2001:10:10:10:10:10:10:1: icmp_seq=3 ttl=64 time=0.300 ms
108 bytes from 2001:10:10:10:10:10:10:1: icmp_seq=4 ttl=64 time=0.309 ms
108 bytes from 2001:10:10:10:10:10:10:1: icmp_seq=5 ttl=64 time=0.299 ms
108 bytes from 2001:10:10:10:10:10:10:1: icmp_seq=6 ttl=64 time=0.313 ms
6 packets transmitted, 6 received, 0% packet loss, time 6999ms
rtt min/avg/max/mdev = 0.299/0.318/0.401/0.031 ms
rfs4000-229D58>
2.1.27 ssh

User Exec Commands

Opens a Secure Shell (SSH) connection between two network devices

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```plaintext
ssh <IP/HOSTNAME> <USER-NAME> {<INF-NAME/LINK-LOCAL-ADD>}
```

Parameters

- `ssh <IP/HOSTNAME> <USER-NAME> {<INF-NAME/LINK-LOCAL-ADD>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;IP/HOSTNAME&gt;</code></td>
<td>Specify the remote system’s IP address or hostname.</td>
</tr>
<tr>
<td><code>&lt;USER-NAME&gt;</code></td>
<td>Specify the name of the user requesting SSH connection with the remote system.</td>
</tr>
<tr>
<td><code>&lt;INF-NAME/LINK-LOCAL-ADD&gt;</code></td>
<td>Optional. Specify the interface’s name or link local address.</td>
</tr>
</tbody>
</table>

Examples

```
nx9500-6C8809>ssh 192.168.13.15 admin
admin@192.168.13.15's password:
rfs7000-37FABE>
```
2.2.18 telnet

User Exec Commands

Opens a Telnet session between two network devices

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

telnet <IP/HOSTNAME> {<TCP-PORT>} {<INTF-NAME>}

Parameters

- telnet <IP/HOSTNAME> {<TCP-PORT>} {<INTF-NAME>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP/HOSTNAME&gt;</td>
<td>Configures the destination remote system’s IP (IPv4 or IPv6) address or hostname. The Telnet session is established between the connecting system and the remote system.</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP/HOSTNAME&gt; – Specify the remote system’s IPv4 or IPv6 address or hostname.</td>
</tr>
<tr>
<td>&lt;TCP-PORT&gt;</td>
<td>Optional. Specify the Transmission Control Protocol (TCP) port number.</td>
</tr>
<tr>
<td>&lt;INTF-NAME&gt;</td>
<td>Optional. Specify the interface name for the link local address.</td>
</tr>
</tbody>
</table>

Examples

nx4500-5CFA8E>telnet 192.168.13.13

Entering character mode
Escape character is '^]'.

NX9500 release 5.8.4.0-008D
nx9500-6C8809 login: admin
Password:
nx9500-6C8809>
2.1.29 terminal

### User Exec Commands
Sets the length and width of the CLI display window on a terminal

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax
```
terminal [length|width] <0-512>
```

### Parameters
- `terminal [length|width] <0-512>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>length &lt;0-512&gt;</code></td>
<td>Sets the number of lines displayed on the terminal window. You can specify a value from 0 to 512.</td>
</tr>
<tr>
<td><code>width &lt;0-512&gt;</code></td>
<td>Sets the width (the number of characters displayed in one line) of the terminal window. You can specify a value from 0 to 512.</td>
</tr>
</tbody>
</table>

### Examples
```
rfs7000-37FABE>terminal length 150
rfs7000-37FABE>terminal width 215
```

```
rfs7000-37FABE>show terminal
Terminal Type: xterm
Length: 150  Width: 215
```

### Related Commands
- `no`: Resets the width or length of the terminal window.
2.1.30 time-it

- **User Exec Commands**
  Verifies the time taken by a particular command between request and response

- Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
time-it <COMMAND>
```

**Parameters**

- `time-it <COMMAND>`

**Examples**

```
rfs7000-37FABE>time-it enable
That took 0.00 seconds..
rfs7000-37FABE#
```
2.1.31 traceroute

User Exec Commands

Traces the route to a defined destination

Use ‘--help’ or ‘-h’ to display a complete list of parameters for the traceroute command

Supported in the following platforms:

• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

traceroute <LINE>

Parameters

• traceroute <LINE>

traceroute <LINE> Traces the route to a destination IP address or hostname

• <LINE> – Specify the destination IPv6 address or hostname.

Examples

rfs7000-37FABE>traceroute --help
BusyBox v1.14.1 () multi-call binary

Usage: traceroute [-FIldnrv] [-f 1st_ttl] [-m max_ttl] [-p port#] [-q nqueries] 
[-s src_addr] [-t tos] [-w wait] [-g gateway] [-i iface] 
[-z pausemsecs] HOST [data size]
Trace the route to HOST
Options:

-F Set the don't fragment bit
-I Use ICMP ECHO instead of UDP datagrams
-l Display the ttl value of the returned packet
-d Set SO_DEBUG options to socket
-n Print hop addresses numerically rather than symbolically
-r Bypass the normal routing tables and send directly to a host
-v Verbose
-m max_ttl Max time-to-live (max number of hops)
-p port# Base UDP port number used in probes (default is 33434)
-q nqueries Number of probes per 'ttl' (default 3)
-s src_addr IP address to use as the source address
-t tos Type-of-service in probe packets (default 0)
-w wait Time in seconds to wait for a response (default 3 sec)
-g Loose source route gateway (0 max)

rfs7000-37FABE>

rfs7000-6DCD4B>traceroute 192.168.13.16
traceroute to 192.168.13.16 (192.168.13.16), 30 hops max, 38 byte packets
  1 192.168.13.16 (192.168.13.16) 5.071 ms 0.294 ms 0.283 ms
rfs7000-6DCD4B>
2.1.32 traceroute6

User Exec Commands

Traces the route to a specified IPv6 destination

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

traceroute6 <LINE>

Parameters

- traceroute6 <LINE>

<table>
<thead>
<tr>
<th>traceroute6 &lt;LINE&gt;</th>
<th>Traces the route to a destination IPv6 address or hostname</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;LINE&gt;</td>
<td>&lt;LINE&gt; – Specify the destination IPv6 address or hostname.</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58>traceroute6 2001:10:10:10:10:10:10:1
rfs4000-229D58>
2.1.33 watch

User Exec Commands

Repeats the specified CLI command at periodic intervals

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

watch <1-3600> <LINE>

Parameters

- watch <1-3600> <LINE>

<table>
<thead>
<tr>
<th>watch</th>
<th>Repeats a CLI command at a specified interval (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-3600&gt;</td>
<td>Select an interval from 1 - 3600 sec. Pressing CTRL-Z halts execution of the command.</td>
</tr>
<tr>
<td>&lt;LINE&gt;</td>
<td>Specify the CLI command.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-6DCD4B>watch 40 ping 192.168.13.16
PING 192.168.13.16 (192.168.13.16) 100(128) bytes of data.
108 bytes from 192.168.13.16: icmp_seq=1 ttl=64 time=0.565 ms
108 bytes from 192.168.13.16: icmp_seq=2 ttl=64 time=0.393 ms
108 bytes from 192.168.13.16: icmp_seq=3 ttl=64 time=0.344 ms
108 bytes from 192.168.13.16: icmp_seq=4 ttl=64 time=0.433 ms
108 bytes from 192.168.13.16: icmp_seq=5 ttl=64 time=0.352 ms

--- 192.168.13.16 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 3997ms
rtt min/avg/max/mdev = 0.344/0.417/0.565/0.082 ms

rfs7000-6DCD4B>
2.1.34 exit

User Exec Commands

Ends the current CLI session and closes the session window

For more information, see exit.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

exit

Parameters

None

Examples

rfs7000-37FABE>exit
2.1.35 smart-cache

Pre-fetches cached content from the specified list of URLs

Smart caching is a licensed service available on the NX45XX and NX65XX series service platforms. It allows the temporary storage of frequently accessed Web content (Web pages, graphics, audio and video files, etc.) on network infrastructure devices. When this content is requested, it is retrieved from a local content cache and not from the origin server. For more information on enabling content caching, see smart-cache-policy.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

smart-cache pre-fetch-immediate <URL-LIST-NAME>

Parameters

- smart-cache pre-fetch-immediate <URL-LIST-NAME>

<table>
<thead>
<tr>
<th>smart-cache</th>
<th>Pre-fetches content from the specified list of URLs</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-fetch-immediate</td>
<td>Provide the URL list names (should be existing and configured). For more information on configuring URL lists, see url-list.</td>
</tr>
</tbody>
</table>

Examples

nx4500-5CFA2B>smart-cache pre-fetch-immediate ?
  URL-LIST  URL List to be Pre Fetched

nx4500-5CFA2B>
2.1.36 virtual-machine

User Exec Commands

Installs, configures, and monitors the status of third-party virtual machines (VMs)

In addition to the WiNG VMs, the NX45XX, NX65XX, NX9500, and NX9510 series service platforms support the installation and administration of third-party VMs. However, the third-party VMs supported by these devices varies.

The third-party VMs supported on NX45XX and NX65XX are:

- TEAM-URC
- TEAM-RLS
- TEAM-VoWLAN

The VM supported on NX9500 and NX9510 is:

- ADSP

Use the virtual-machine command to install the third-party VMs, and configure parameters, such as install media type and location, number of Virtual Central Processing Units (VCPUS), VM memory, VM disk, number of Virtual Network Interfaces (VIFs), and Virtual Networking Computing (VNC) port.

Installing third-party VMs saves on hardware cost and provides a unified VM management interface.

This section is organized into the following sub-sections:

- Syntax NX45XX, NX65XX
- Syntax NX9500 and NX9510

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax NX45XX, NX65XX

virtual-machine [assign-usb-ports|console|export|install|restart|set|start|stop|uninstall]

virtual-machine assign-usb-ports team-vowlan {on <DEVICE-NAME>}

virtual-machine console [{<VM-NAME>|team-urc|team-rls|team-vowlan}

virtual-machine export <VM-NAME> [<FILE>|<URL>] {on <DEVICE-NAME>}

virtual-machine install [<VM-NAME>|team-urc|team-rls|team-vowlan]

virtual-machine install <VM-NAME> type [disk|iso disk-size <SIZE>|vm-archive]

install-media [<FILE>|<URL>|<USB>] {autostart|memory|on|vcpus|vif-count|vnc}

virtual-machine install [team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine restart [{<VM-NAME>|hard|team-urc|team-rls|team-vowlan]

virtual-machine restart [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine restart hard [{<VM-NAME>|team-urc|team-rls|team-vowlan]

{on <DEVICE-NAME>}

virtual-machine set [autostart|memory|vcpus|vif-count|vif-mac|vif-to-vmif|vnc]

virtual-machine set [autostart|ignore|start] memory {$12-8192} vcpus <1-4>

vif-count <0-255> vif-mac <VIF-INDEX> [vif-to-vmif <VIF-INDEX>

vnc [disable|enable] [<MAC-INDEX>|<MAC>]

{on <DEVICE-NAME>}

virtual-machine start [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop [{<VM-NAME>|hard|team-urc|team-rls|team-vowlan]

virtual-machine stop [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [{<VM-NAME>|team-urc|team-rls|team-vowlan}
virtual-machine uninstall \(<\text{VM-NAME}>|\text{team-urc}|\text{team-rls}|\text{team-vowlan}\) \{on \<\text{DEVICE-NAME}>\}

**Parameters NX45XX, NX65XX**

- virtual-machine assign-usb-ports team-vowlan \{on \<\text{DEVICE-NAME}>\}

assign-usb-ports

\begin{tabular}{|l|}
\hline
\textbf{team-vowlan} \{on \<\text{DEVICE-NAME}>\} \tab \text{Assigns USB ports to TEAM-VoWLAN} \\
\hline
\textbf{team-urc} \tab \text{TEAM Unified Retail Communication’s (URC) (IP-PBX) console} \\
\hline
\textbf{team-rls} \tab \text{TEAM Radio Link Service (RLS) server’s console} \\
\hline
\textbf{team-vowlan} \tab \text{TEAM-VoWLAN’s (Voice over WLAN) console} \\
\hline
\end{tabular}

Use the \texttt{no > virtual-machine > assign-usb-ports} command to reassign the port to WiNG.

**Note:** TEAM-RLS VM cannot be installed when USB ports are assigned to TEAM-VoWLAN.

virtual-machine console \[\<\text{VM-NAME}>|\text{team-urc}|\text{team-rls}|\text{team-vowlan}\]

virtual-machine export \<\text{VM-NAME}> \[\<\text{FILE}|\<\text{URL}\] \{on \<\text{DEVICE-NAME}>\}

virtual-machine install \<\text{VM-NAME}> type \[\text{disk}|\text{iso disk-size <SIZE}>|\text{vm-archive}\] install-media \[\<\text{FILE}|\<\text{URL}|\<\text{USB}\] \{\text{autostart}|\text{memory}|\text{on}|\text{vcpus}|\text{vif-count}|\text{vnc}\}

virtual-machine install \<\text{VM-NAME}> type \[\text{disk}|\text{iso disk-size <SIZE}>|\text{vm-archive}\] install-media \[\<\text{FILE}|\<\text{URL}|\<\text{USB}\] \{\text{autostart}|\text{memory}|\text{on}|\text{vcpus}|\text{vif-count}|\text{vnc}\}

The VM should be in a stop state during the export process.

If the destination is a device, the image is copied to a predefined location (VM archive).
• iso disk-size <SIZE> – Specifies the install media type as ISO file. This is a single file, which contains the OS bootable install media.
• disk-size <SIZE> – If the install media type is ISO, specify the disk size in GB.
• vm-archive – Specifies the install media type as VM archive. The VM archive file is a tar.gz file consisting of a pre-installed OS disk image and an associated configuration file. The configuration is a standard libvirt VM template consisting of VM specific information.

Note: After specifying the install media type, specify the location of the image. The image can be located in any of the following supported locations: FLASH, USB, or a remote location, such as http, ftp, sftp, tftp.

install-media [<FILE>|<URL>|<USB>] {autostart|memory|on|vcpus|vif-count|vnc}

Specifies the install media location
• <FILE> – Specifies the install-media file is located on flash, for example flash:/cache
• <URL> – Specifies the install-media file is located on a remote URL. Provide the URL using one of the following formats:
tftp://<hostname|IP>[:port]/path/file
ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file
sftp://<user>:<passwd>@<hostname|IP>[:port]/path/file
http://<hostname|IP>[:port]/path/file
• <USB> – Specifies the install-media file is located on a USB. Provide the USB path and file name using the following format:
usb<n>:/path/file

After specifying the image location, you may provide the following information:
• autostart – Optional. Specifies whether to autostart the VM on system reboot
• ignore – Enables autostart on each system boot/reboot
• start – Disables autostart (default setting)
• memory – Optional. Defines the VM memory size
  • <512-8192> – Specify the VM memory from 512 - 8192 MB. The default is 2048 MB.
• on – Optional. Executes the command on a specified device
  • <DEVICE-NAME> – Specify the service platform name.
• vcpus – Optional. Specifies the number of VCPUS for this VM
  • <1-4> – Specify the number of VCPUS from 1- 4. The default setting is 4.
• vif-count – Optional. Configures or resets the VIF number for this VM
  • <0-2> – Specify the VIF number from 0 - 2. the default setting is 1. If assigning a virtual network interface for the VM, optionally specify the following parameters:
    • vif-mac – Sets the MAC index for the virtual interfaces 1 & 2.
    • vif-to-vmif – Maps the virtual interface (1 or 2) to the selected VMIF interface. Specify the VMIF interface index from 1 - 8. VMIFs are layer 2 interfaces on the WiNG bridge. Each custom VM can have up to a maximum of 2 virtual Ethernet interfaces. By default, these interfaces are internally connected to the Dataplane bridge through VMIF1, which is an untagged port with access VLAN 1.
  • vnc – Enables VNC on the virtual interfaces 1 & 2
• vnc – Optional. Disables/enables VNC port. When enabled, provides remote access to VGA through the noVNC client.
  • disable – Disables VNC
  • enable – Enables VNC (default setting)
### virtual-machine install [team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

Installs the VM. The install command internally creates a VM template, consisting of the specified parameters, and starts the installation process. Select one of the following options:

- **team-urc** – Installs the VM TEAM-URC image
- **team-rls** – Installs the VM TEAM-RLS image
- **team-vowlan** – Installs the VM TEAM-VoWLAN image

The following keywords are common to all of the above parameters:

- **on <DEVICE-NAME>** – Optional. Executes the command on a specified device or devices
- **<DEVICE-NAME>** – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

### virtual-machine restart [<VM-NAME>|hard|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

Restarts the VM

- **<VM-NAME>** – Restarts the VM identified by the <VM-NAME> keyword
- **team-urc** – Restarts the VM TEAM-URC
- **team-rls** – Restarts the VM TEAM-RLS
- **team-vowlan** – Restarts the VM TEAM-VoWLAN

The following keywords are common to all of the above parameters:

- **on <DEVICE-NAME>** – Optional. Executes the command on a specified device or devices
- **<DEVICE-NAME>** – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

The option 'hard' forces the specified VM to restart.


Configures the VM settings

- **autostart** – Specifies whether to autostart the VM on system reboot
- **ignore** – Enables autostart on each system reboot
- **start** – Disables autostart
- **memory** – Defines the VM memory size
  - **<512-8192>** – Specify the VM memory from 512 - 8192 MB. The default is 1024 MB.
  - **vcpus** – Specifies the number of VCPUS for this VM
    - **<1-4>** – Specify the number of VCPUS from 1 - 4.
  - **vif-count** – Configures or resets the VM’s VIFs
    - **<0-2>** – Specify the Virtual Interface (VIF) number from 0 - 2.
  - **vif-mac** – Configures the MAC address of the selected virtual network interface
    - **<MAC-INDEX>** – Specify the MAC index for the selected VIF from 1 - 8.
    - **<MAC>** – Specify the customized MAC address for the selected VIF in the AA-BB-CC-DD-EE-FF format.

Contd..
Each VM has a maximum of two network interfaces (indexed 1 and 2, referred to as VIF). By default, each VIF is automatically assigned a MAC from the range allocated for that device. However, you can use the ‘set’ keyword to specify the MAC from within the allocated range. Each of these VIFs are mapped to a layer 2 port in the dataplane (referred to as VMIF). These VMIFs are standard l2 ports on the DP bridge, supporting all VLAN and ACL commands. The WiNG software supports up to a maximum of 8 VMIFs. By default, a VM’s interface is always mapped to VMIF1. You can map a VIF to any of the 8 VMIFs. Use the `vif-to-vmif` command to map a VIF to a VMIF on the DP bridge.

- `vif-to-vmif` – Maps the virtual interface (1 or 2) to the selected VMIF interface.
  Specify the VMIF interface index from 1 - 8.
- `<VIF-INDEX>` – Selects the VIF index from 1 - 2.
- `<VMIF-INDEX>` – Specify the VMIF index from 1 - 8.

WiNG provides a dataplane bridge for external network connectivity for VMs. VM Interfaces define which IP address is associated with each VLAN ID the service platform is connected to and enables remote service platform administration. Each custom VM can have up to a maximum of two VM interfaces. Each VM interface can be mapped to one of the eight VMIF ports for NX4500 and NX6500 service platforms and twelve ports for NX9500 on the dataplane bridge. This mapping determines the destination for service platform routing.

By default, VM interfaces are internally connected to the dataplane bridge via VMIF1. VMIF1, by default, is an untagged port providing access to VLAN 1 to support the capability to connect the VM interfaces to any of the VMIF ports. This provides the flexibility to move a VM interface onto different VLANs as well as configure specific firewall and QoS rules.

- `vnc` – Disables/enables VNC port option for an existing VM. When enabled, provides remote access to VGA through the noVNC client.
- `disable` – Disables VNC port
- `enable` – Enables VNC port

After configuring the VM settings, identify the VM to apply the settings.

- `<VM-NAME>` – Applies these settings to the VM identified by the `<VM-NAME>` keyword. Specify the VM name.
- `team-urc` – Applies these settings to the VM TEAM-URC
- `team-rls` – Applies these settings to the VM TEAM-RLS
- `team-vowlan` – Applies these settings to the VM TEAM-VoWLAN
  - on `<DEVICE-NAME>` – Optional. Executes the command on a specified device or devices
  - `<DEVICE-NAME>` – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

### virtual-machine start

| `<VM-NAME>` | `<DEVICE-NAME>` |
| `team-urc` | `team-rls` | `team-vowlan` |

Starts the VM, based on the parameters passed. Select one of the following options:

- `<VM-NAME>` – Starts the VM identified by the `<VM-NAME>` keyword. Specify the VM name.
- `team-urc` – Starts the VM TEAM-URC
- `team-rls` – Starts the VM TEAM-RLS
- `team-vowlan` – Starts the VM TEAM-VoWLAN

Contd..
virtual-machine stop [\(<VM-NAME>\)|hard|team-urc|team-rls|team-vowlan] \(\{on <DEVICE-NAME>\}\)

Stops the VM, based on the parameters passed. Select one of the following options:
- \(<VM-NAME>\) – Stops the VM identified by the \(<VM-NAME>\) keyword. Specify the VM name.
- team-urc – Stops the VM TEAM-URC
- team-rls – Stops the VM TEAM-RLS
- team-vowlan – Stops the VM TEAM-VoWLAN

The following keywords are common to all of the above parameters:
- \(\{on <DEVICE-NAME>\}\) – Optional. Executes the command on a specified device or devices
- \(<DEVICE-NAME>\) – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

The option 'hard' forces the selected VM to shutdown.

virtual-machine uninstall [\(<VM-NAME>\)|team-urc|team-rls|team-vowlan] \(\{on <DEVICE-NAME>\}\)

Uninstalls the specified VM
- \(<VM-NAME>\) – Uninstalls the VM identified by the \(<VM-NAME>\) keyword. Specify the VM name.
- team-urc – Uninstalls the VM TEAM-URC
- team-rls – Uninstalls the VM TEAM-RLS
- team-vowlan – Uninstalls the VM TEAM-VoWLAN

The following keywords are common to all of the above parameters:
- \(\{on <DEVICE-NAME>\}\) – Optional. Executes the command on a specified device or devices
- \(<DEVICE-NAME>\) – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

Note: This command releases the VM's resources, such as memory, VCPUS, VNC port, disk space, and removes the RF Domain reference from the system.

Syntax NX9500 and NX9510

\(\uparrow virtual-machine\)

virtual-machine console adsp
virtual-machine install [adsp] \(\{on <DEVICE-NAME>\}\)
virtual-machine restart [adsp] \(\{on <DEVICE-NAME>\}\)
virtual-machine set disk-size <100-500> adsp \(\{on <DEVICE-NAME>\}\)
virtual-machine set memory <512-8192> adsp \(\{on <DEVICE-NAME>\}\)
virtual-machine set wing-memory <12288-32739>
virtual-machine [start|stop] adsp \(\{on <DEVICE-NAME>\}\)
virtual-machine uninstall adsp \(\{on <DEVICE-NAME>\}\)

Note: On an NX95XX, you can use the install, start, stop, restart, and set commands to manage a third-party VM running on a NX45XX and NX65XX. You can also configure a third-party VM's settings through a NX95XX series service platform.
### Parameters NX9500 and NX9510

- **virtual-machine console adsp**

  Connects to the *Air-Defense Services Platform (ADSP)* VM's management console. When ADSP is running on the NX9500 and NX9510 model service platforms, WiNG communicates with ADSP using a *single sign-on (SSO)* authentication mechanism. Once the user is logged in, WiNG gains access to ADSP without being prompted to login again at ADSP. However, the WiNG and ADSP databases are not synchronized. ADSP has its own user database, stored locally within its VM, which is accessed whenever a user logs directly into ADSP.

  WiNG and ADSP must be consistent in the manner events are reported up through a network hierarchy to ensure optimal interoperability and event reporting. To provide such consistency, WiNG has added support for an ADSP-like hierarchal tree. The tree resides within WiNG, and ADSP reads it from WiNG and displays the network hierarchy in its own ADSP interface. The hierarchal tree can also be used to launch ADSP modules (like Spectrum Analyzer) directly from WiNG. For more information on configuring WiNG tree-node structure, see [tree-node](#).

- **virtual-machine install adsp {on <DEVICE-NAME>}**

  Installs the ADSP VM
  - on <DEVICE-NAME> – Optional. Executes the command on a specified device or devices
  - <DEVICE-NAME> – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

  Before installing the ADSP VM, execute the upgrade command, giving the path and file name of the ADSP firmware image. This extracts the image on to the device (NX9500 or NX9510) on which the command has been executed. On successful completion of this process, execute the reload command to reboot the device. Once the device has been successfully rebooted, execute the `virtual-machine > install > adsp` command.

  For example:
  ```
  #upgrade tftp://20.1.1.60/adsp-9.1.1May 29 15:12:41 2015:
  %DAEMON-6-INFO: lighttpd[2405]: 127.0.0.1 127.0.0.1:443 -
  "POST /mapi.fcgi HTTP/1.1" 200 192 "-" "-
  03-5.8.4.0-008D.img
  May 29 15:12:51 2016: nx9500-6C874D : %DIAG-6-
  NEW_LED_STATE: LED state message FIRMWARE_UPGRADE_STARTED
  from module led_msg
  Running from partition /dev/sda8
  Validating image file header
  Extracting files (this may take some time).....May 29
  15:12:53 2014: %DAEMON-6-INFO: lighttpd[2405]: 127.0.0.1
  127.0.0.1:443 - "POST /mapi.fcgi HTTP/1.1" 200 923 "-" "-
  "...........
  ```

- **virtual-machine restart adsp {on <DEVICE-NAME>}**

  Restarts the ADSP VM
  - adsp – Sets the VM as ADSP
  - on <DEVICE-NAME> – Optional. Executes the command on a specified device or devices
  - <DEVICE-NAME> – Specify the service platform name. In case of multiple devices, list the device names separated by commas.
### virtual-machine set disk-size <100-500> adsp {on <DEVICE-NAME>}

Sets the ADSP VM's disk size (in GB):
- `<100-500>` – Specify a value from 100 - 500 GB.
- `adsp` – Sets the VM as ADSP
- `on <DEVICE-NAME>` – Optional. Executes the command on a specified device or devices
  - `<DEVICE-NAME>` – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

Stop the ADSP VM before executing this command.

### virtual-machine set memory <512-8192> adsp {on <DEVICE-NAME>}

Modifies the ADSP VM's memory:
- `<512-8192>` – Specify a value from 512 - 8192 MB.
- `adsp` – Sets the VM as ADSP
- `on <DEVICE-NAME>` – Optional. Executes the command on a specified device or devices
  - `<DEVICE-NAME>` – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

### virtual-machine set wing-memory <12288-32739>

Specifies the WiNG memory size in MB
This command is applicable only to the NX9500 and NX9510 service platforms. Use the `show > virtual-machine-configuration` command to view the configured memory allocation. Use the `show > virtual-machine-statistics` to view the current allocated memory allocation.
- `<12288-32739>` – Specify a value from 12288 - 32739 MB. The default is 18432 MB.

The new memory setting takes effect only after the next boot.

### virtual-machine [start|stop] adsp {on <DEVICE-NAME>}

Starts/stops the ADSP VM:
- `adsp` – Sets the VM as ADSP
  - `start` – Starts the ADSP VM. Use this command to boot a shut down VM (in a stop state).
  - `stop` – Stops a running ADSP VM. Use this command to shut down a running VM.
- `on <DEVICE-NAME>` – Optional. Executes the start/stop command on a specified device or devices
  - `<DEVICE-NAME>` – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

### virtual-machine uninstall adsp {on <DEVICE-NAME>}

Uninstalls the ADSP VM:
- `adsp` – Sets the VM as ADSP
- `on <DEVICE-NAME>` – Optional. Executes the command on a specified device or devices
  - `<DEVICE-NAME>` – Specify the service platform name. In case of multiple devices, list the device names separated by commas.
Examples

The following examples show the VM installation process:

**Installation media: USB**

```
<DEVICE>>virtual-machine install <VM-NAME> type iso disk-size 8 install-media usb1://vms/win7.iso autostart start memory 512 vcpus 3 vif-count 2 vnc enable
```

**Installation media: pre-installed disk image**

```
<DEVICE>>virtual-machine install <VM-NAME> type disk install-media flash:/vms/win7_disk.img autostart start memory 512 vcpus 3 vif-count 2 vnc-enable on <DEVICE-NAME>
```

In the preceding example, the command is executed on the device identified by the `<DEVICE-NAME>` keyword. In such a scenario, the disk-size is ignored if specified. The VM has the install media as first boot device.

**Installation media: VM archive**

```
<DEVICE>>virtual-machine install type vm-archive install-media flash:/vms/<VM-NAME> vcpus 3
```

In the preceding example, the default configuration attached with the VM archive overrides any parameters specified.

**Exporting an installed VM:**

```
<DEVICE>>virtual-machine export <VM-NAME> <URL> on <DEVICE-NAME>
```

In the preceding example, the command copies the VM archive on to the URL (VM should be in stop state).

```
nx4500-5CFA2B>virtual-machine install team-urc
Virtual Machine install team-urc command successfully sent.
nx4500-5CFA2B>
```

---

**NOTE:** Use the `show > virtual-machine > [configuration|debugging|export|statistics]` command to view installed VM details.

---

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Reassigns USB port to WiNG</td>
</tr>
</tbody>
</table>
CHAPTER 3
PRIVILEGED EXEC MODE COMMANDS

Most PRIV EXEC commands set operating parameters. Privileged-level access should be password protected to prevent unauthorized use. The PRIV EXEC command set includes commands contained within the USER EXEC mode. The PRIV EXEC mode also provides access to configuration modes, and includes advanced testing commands.

The PRIV EXEC mode prompt consists of the hostname of the device followed by a pound sign (#).

To access the PRIV EXEC mode, enter the following at the prompt:

<DEVICE>>enable
<DEVICE>#

The PRIV EXEC mode is often referred to as the enable mode, because the enable command is used to enter the mode.

There is no provision to configure a password to get direct access to PRIV EXEC (enable) mode.

<DEVICE>#!
Privileged command commands:
archive                     Manage archive files
boot                        Boot commands
captive-portal-page-upload Captive portal internal and advanced page upload
cd                          Change current directory
change-passwd               Change password
clear                       Clear
clock                       Configure software system clock
cluster                     Cluster commands
commit                      Commit all changes made in this session
configure                   Enter configuration mode
connect                     Open a console connection to a remote device
copy                        Copy contents of one dir to another
cpe                         T5 CPE configuration
create-cluster              Create a cluster
crypto                      Encryption related commands
crypto-cmp-cert-update      Update the cmp certs
database                    Database
database-backup             Backup database
database-restore            Restore database
debug                       Debugging functions
delete                      Deletes specified file from the system
device-upgrade              Device firmware upgrade
diff                        Display differences between two files
dir                          List files on a filesystem
disable                     Turn off privileged mode command
dir                         Edit a text file
enable                      Turn on privileged mode command
erase                       Erase a filesystem
ex3500                      EX3500 commands
factory-reset               Delete startup configuration on device(s),
                            reload the device(s) and remove configuration
                            entry from the controller
file-sync                   File sync between controller and adoptees
format                      Format file system
halt                        Halt the system
help                        Description of the interactive help system
join-cluster                Join the cluster
l2tpv3                      L2tpv3 protocol
logging                     Modify message logging facilities
mint                        MiNT protocol
mkdir                       Create a directory
more                        Display the contents of a file
no                          Negate a command or set its defaults
on                          On RF-Domain
opendns                     Opendns username/password configuration
page                        Toggle paging
ping                        Send ICMP echo messages
ping6                       Send ICMPv6 echo messages
pwd                         Display current directory
raid                        RAID operations
re-elect                    Perform re-election
reload                      Halt and perform a warm reboot
remote-debug                Troubleshoot remote system(s)
rename                      Rename a file
revert                      Revert changes
rmdir                       Delete a directory
self                        Config context of the device currently logged
                            into
service                     Service Commands
show                        Show running system information
smart-cache                 Content Cache Operation
ssh                         Open an ssh connection
t5                          T5 commands
telnet                      Open a telnet connection
terminal                    Set terminal line parameters
time-it                     Check how long a particular command took between
                            request and completion of response
traceroute                  Trace route to destination
traceroute6                 Trace route to destination(IPv6)
upgrade                     Upgrade software image
upgrade-abort               Abort an ongoing upgrade
virtual-machine             Virtual Machine
watch                       Repeat the specific CLI command at a periodic
                            interval
write                       Write running configuration to memory or
                            terminal
clrscr                      Clears the display screen
exit                        Exit from the CLI

<DEVICE>#

NOTE: The input parameter <HOSTNAME>, wherever used in syntaxes across
this chapter, cannot include an underscore (_) character.
## 3.1 Privileged Exec Mode Commands

The following table summarizes the PRIV EXEC Mode commands:

**Table 3.1 Privileged Exec Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>archive</td>
<td>Manages file archive operations</td>
<td>page 3-6</td>
</tr>
<tr>
<td>boot</td>
<td>Specifies the image used after reboot</td>
<td>page 3-8</td>
</tr>
<tr>
<td>captive-portal-page-upload</td>
<td>Uploads captive portal advanced pages</td>
<td>page 3-9</td>
</tr>
<tr>
<td>cd</td>
<td>Changes the current directory</td>
<td>page 3-12</td>
</tr>
<tr>
<td>change-passwd</td>
<td>Changes the password of a logged user</td>
<td>page 3-13</td>
</tr>
<tr>
<td>clear</td>
<td>Clears parameters, cache entries, table entries, and other similar entries</td>
<td>page 3-14</td>
</tr>
<tr>
<td>clock</td>
<td>Configures the system clock</td>
<td>page 3-27</td>
</tr>
<tr>
<td>cluster</td>
<td>Initiates a cluster context</td>
<td>page 3-28</td>
</tr>
<tr>
<td>configure</td>
<td>Enters the global configuration mode</td>
<td>page 3-29</td>
</tr>
<tr>
<td>connect</td>
<td>Begins a console connection to a remote device</td>
<td>page 3-30</td>
</tr>
<tr>
<td>copy</td>
<td>Copies a file from any location to the wireless controller, service platform, or access point</td>
<td>page 3-31</td>
</tr>
<tr>
<td>cpe</td>
<td>Enables a WiNG controller to perform certain operations on an adopted T5 Customer Premises Equipment (CPE) device. This command is specific to the RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, NX9XXX devices.</td>
<td>page 3-32</td>
</tr>
<tr>
<td>create-cluster</td>
<td>Creates a new cluster on a specified device</td>
<td>page 3-34</td>
</tr>
<tr>
<td>crypto</td>
<td>Enables encryption</td>
<td>page 3-36</td>
</tr>
<tr>
<td>crypto-cmp-cert-update</td>
<td>Triggers a CMP certificate update on a specified device or devices</td>
<td>page 3-45</td>
</tr>
<tr>
<td>database</td>
<td>Enables automatic repairing (vacuuming) and dropping of databases (Captive-portal and NSight)</td>
<td>page 3-46</td>
</tr>
<tr>
<td>database-backup</td>
<td>Backs up captive-portal and/or NSight database to a specified location and file on an FTP or SFTP server</td>
<td>page 3-47</td>
</tr>
<tr>
<td>database-restore</td>
<td>Restores a previously exported database [captive-portal and/or NSight]. Previously exported databases (backed up to a specified FTP or SFTP server) are restored to the original database.</td>
<td>page 3-48</td>
</tr>
<tr>
<td>delete</td>
<td>Deletes a specified file from the system</td>
<td>page 3-49</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Configures device firmware upgrade parameters</td>
<td>page 3-50</td>
</tr>
<tr>
<td>diff</td>
<td>Displays the differences between two files</td>
<td>page 3-58</td>
</tr>
<tr>
<td>dir</td>
<td>Displays the list of files on a file system</td>
<td>page 3-59</td>
</tr>
<tr>
<td>disable</td>
<td>Disables the privileged mode command set</td>
<td>page 3-60</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>edit</td>
<td>Edits a text file</td>
<td>page 3-61</td>
</tr>
<tr>
<td>enable</td>
<td>Turns on (enables) the privileged mode commands set</td>
<td>page 3-62</td>
</tr>
<tr>
<td>erase</td>
<td>Erases a file system</td>
<td>page 3-63</td>
</tr>
<tr>
<td>ex3500</td>
<td>Enables EX3500 switch firmware management. Use this command to perform the following operations: boot, copy, delete, and IP related configurations.</td>
<td>page 3-65</td>
</tr>
<tr>
<td>factory-reset</td>
<td>Erases startup configuration on a specified device or all devices within a specified RF Domain</td>
<td>page 3-72</td>
</tr>
<tr>
<td>file-sync</td>
<td>Configures parameters enabling syncing of PKCS#12 certificate between the staging-controller and adoptee AP6522/AP6562 client-bridge access points</td>
<td>page 3-76</td>
</tr>
<tr>
<td>format</td>
<td>Formats a device’s compact flash file system</td>
<td>page 3-78</td>
</tr>
<tr>
<td>halt</td>
<td>Halts a device (access point, wireless controller, or service platform)</td>
<td>page 3-79</td>
</tr>
<tr>
<td>join-cluster</td>
<td>Adds a device (access point, wireless controller, or service platform), as cluster member, to an existing cluster of devices</td>
<td>page 3-80</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>Establishes or brings down Layer 2 Tunneling Protocol Version 3 (L2TPV3) tunnels</td>
<td>page 3-82</td>
</tr>
<tr>
<td>logging</td>
<td>Modifies message logging parameters</td>
<td>page 3-84</td>
</tr>
<tr>
<td>mint</td>
<td>Configures MiNT protocols</td>
<td>page 3-86</td>
</tr>
<tr>
<td>mkdir</td>
<td>Creates a new directory in the file system</td>
<td>page 3-88</td>
</tr>
<tr>
<td>more</td>
<td>Displays the contents of a file</td>
<td>page 3-89</td>
</tr>
<tr>
<td>no</td>
<td>Reverts a command or sets values to their default</td>
<td>page 3-90</td>
</tr>
<tr>
<td>on</td>
<td>Executes the following commands in the RF Domain context: clrscr, do, end, exit, help, service, show</td>
<td>page 3-92</td>
</tr>
<tr>
<td>opendns</td>
<td>Connects to the OpenDNS site using OpenDNS registered credentials (username, password) to obtain the device-id. This command is a part of the process integrating access points and controllers with the OpenDNS service.</td>
<td>page 3-93</td>
</tr>
<tr>
<td>page</td>
<td>Toggles a device’s (access point, wireless controller, or service platform) paging function</td>
<td>page 3-95</td>
</tr>
<tr>
<td>ping</td>
<td>Sends ICMP echo messages to a user-specified location</td>
<td>page 3-96</td>
</tr>
<tr>
<td>ping6</td>
<td>Sends ICMPv6 echo messages to a user-specified location</td>
<td>page 3-98</td>
</tr>
<tr>
<td>pwd</td>
<td>Displays the current directory</td>
<td>page 3-99</td>
</tr>
<tr>
<td>re-elect</td>
<td>Re-elects the tunnel controller (wireless controller, service platform, or access point)</td>
<td>page 3-100</td>
</tr>
<tr>
<td>reload</td>
<td>Halts a device (wireless controller, service platform, or access point) and performs a warm reboot</td>
<td>page 3-101</td>
</tr>
</tbody>
</table>
### Table 3.1 Privileged Exec Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>rename</td>
<td>Renames a file in the existing file system</td>
<td>page 3-106</td>
</tr>
<tr>
<td>rmdir</td>
<td>Deletes an existing file from the file system</td>
<td>page 3-107</td>
</tr>
<tr>
<td>self</td>
<td>Displays the configuration context of the device</td>
<td>page 3-108</td>
</tr>
<tr>
<td>ssh</td>
<td>Connects to another device using a secure shell</td>
<td>page 3-109</td>
</tr>
<tr>
<td>t5</td>
<td>Executes the following operations on a T5 device: copy, rename, delete, and write. This command is specific to the RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, NX9XXX devices.</td>
<td>page 3-110</td>
</tr>
<tr>
<td>telnet</td>
<td>Opens a Telnet session</td>
<td>page 3-112</td>
</tr>
<tr>
<td>terminal</td>
<td>Sets the length and width of the terminal window</td>
<td>page 3-113</td>
</tr>
<tr>
<td>time-it</td>
<td>Verifies the time taken by a particular command between request and response</td>
<td>page 3-114</td>
</tr>
<tr>
<td>traceroute</td>
<td>Traces the route to a defined destination</td>
<td>page 3-115</td>
</tr>
<tr>
<td>traceroute6</td>
<td>Sends ICMPv6 echo messages to a user-specified location</td>
<td>page 3-116</td>
</tr>
<tr>
<td>upgrade</td>
<td>Upgrades the software image</td>
<td>page 3-117</td>
</tr>
<tr>
<td>upgrade-abort</td>
<td>Aborts an ongoing software image upgrade</td>
<td>page 3-121</td>
</tr>
<tr>
<td>watch</td>
<td>Repeats a specified CLI command at a periodic interval</td>
<td>page 3-122</td>
</tr>
<tr>
<td>smart-cache</td>
<td>Pre-fetches content cache from the specified list of URLs. This command is specific to the NX45XX and NX65XX series service platforms.</td>
<td>page 3-124</td>
</tr>
<tr>
<td>virtual-machine</td>
<td>Installs, configures, and monitors the status of virtual machines (VMs). This command is specific to the NX45XX, NX65XX, NX9500, NX9510, and NX9600 series service platforms.</td>
<td>page 3-125</td>
</tr>
<tr>
<td>raid</td>
<td>Enables RAID management. This command is specific to the NX9500 series service platforms.</td>
<td>page 3-135</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.

**NOTE:** The input parameter `<HOSTNAME>`, if used in syntaxes across this chapter, cannot include an underscore (_) character.
### 3.1.1 archive

**Privileged Exec Mode Commands**

Manages file archive operations

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
archive tar /table [<FILE>|<URL>]
archive tar /create [<FILE>|<URL>] <FILE>
archive tar /xtract [<FILE>|<URL>] <DIR>
```

**Parameters**

1. `archive tar /table [<FILE>|<URL>]`
   - **tar** Manipulates (creates, lists, or extracts) a tar file
   - `/table` Lists the files in a tar file
   - `<FILE>` Defines a tar filename
   - `<URL>` Sets the tar file URL

2. `archive tar /create [<FILE>|<URL>] <FILE>`
   - **tar** Manipulates (creates, lists or extracts) a tar file
   - `/create` Creates a tar file
   - `<FILE>` Defines tar filename
   - `<URL>` Sets the tar file URL

3. `archive tar /xtract [<FILE>|<URL>] <DIR>`
   - **tar** Manipulates (creates, lists or extracts) a tar file
   - `/xtract` Extracts content from a tar file
   - `<FILE>` Defines tar filename
   - `<URL>` Sets the tar file URL
   - `<DIR>` Specify a directory name. When used with /create, dir is the source directory for the tar file. When used with /xtract, dir is the destination file where contents of the tar file are extracted.
Examples

Following examples show how to zip the folder flash:/log/?

nx9500-6C8809# dir flash:/
Directory of flash:/

    drwx  Tue Mar 17 07:01:39 2015  crashinfo
    drwx  Thu May 16 09:29:10 2013  upgrade
    drwx  Tue Mar 17 09:53:15 2015  log
    drwx  Wed Mar 18 06:27:08 2015  archived_logs
    drwx  Thu May 16 09:29:10 2013  cache
    drwx  Thu Feb 19 08:53:45 2015  floorplans
    drwx  Mon Sep 15 03:40:02 2014  hotspot

nx9500-6C8809#

nx9500-6C8809# archive tar /create flash:/in.tar flash:/log/
log/log/adopts.log.2
log/log/user_reg_report-426543113.csv
log/log/dpd2.log
log/log/mart_websock_server.log
log/log/nuxi/log
log/log/nuxi/beanyaml.log
log/log/nuxi/statsreqresp.1.log
log/log/nuxi/hadoop.log.2014-08-03
log/log/nuxi/puts.log
log/log/nuxi/copy2w.log
log/log/nuxi/obj2yaml.log
log/log/nuxi/infl.log
log/log/nuxi/copy2mb.log
log/log/nuxi/amf.log
--More--

nx9500-6C8809#

nx9500-6C8809# dir flash:/
Directory of flash:/

    drwx  Tue Mar 17 07:01:39 2015  crashinfo
    drwx  Thu May 16 09:29:10 2013  upgrade
    drwx  Tue Mar 17 09:53:15 2015  log
    drwx  Wed Mar 18 06:34:08 2015  archived_logs
    drwx  Thu May 16 09:29:10 2013  cache
    drwx  Thu Feb 19 08:53:45 2015  floorplans
    -rw-  29708288  Wed Mar 18 06:32:13 2015  in.tar
    drwx  Mon Sep 15 03:40:02 2014  hotspot

nx9500-6C8809#
3.1.2 boot

Privileged Exec Mode Commands

Specifies the image used after reboot

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

boot system [primary|secondary] {on <DEVICE-NAME>}

Parameters

- boot system [primary|secondary] {on <DEVICE-NAME>}

system [primary|secondary] Specifies the image used after a device reboot
  - primary – Uses the primary image after reboot
  - secondary – Uses the secondary image after reboot

on <DEVICE-NAME> Optional. Specifies the primary or secondary image location on a specified device
  - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

Examples

nx9500-6C8809# show boot

```
+--------------+-----------+----------------+---------+
|              | IMAGE     | BUILD DATE      | INSTALL DATE | VERSION |
|--------------+-----------+----------------+---------+
| Primary      | 04/27/2016 22:43:30 | 04/29/2016 11:58:57 | 5.8.4.0-008D |
| Secondary    | 04/22/2016 09:28:02  | 04/25/2016 11:30:20  | 5.8.4.0-007D |
```

Current Boot : Secondary
Next Boot : Secondary
Software Fallback : Enabled
VM support : present

nx9500-6C8809#

nx9500-6C8809# boot system primary
Updated system boot partition
nx9500-6C8809#

nx9500-6C8809# show boot

```
+--------------+-----------+----------------+---------+
|              | IMAGE     | BUILD DATE      | INSTALL DATE | VERSION |
|--------------+-----------+----------------+---------+
| Primary      | 04/27/2016 22:43:30 | 04/29/2016 11:58:57 | 5.8.4.0-008D |
| Secondary    | 04/22/2016 09:28:02  | 04/25/2016 11:30:20  | 5.8.4.0-007D |
```

Current Boot : Secondary
Next Boot : Primary
Software Fallback : Enabled
VM support : present

nx9500-6C8809#
3.1.3 captive-portal-page-upload

Privileged Exec Mode Commands

Uploads captive portal advanced pages to connected access points. Use this command to provide connected access points with specific captive portal configurations so they can successfully provision login, welcome, and condition pages to requesting clients attempting to access the wireless network using the captive portal.

NOTE: Ensure that the captive portal pages to be uploaded are *.tar files.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

captive-portal-page-upload [<CAPTIVE-PORTAL-NAME>|cancel-upload|delete-file|load-file]
captive-portal-page-upload <CAPTIVE-PORTAL-NAME> [<MAC/HOSTNAME]|all|rf-domain]
captive-portal-page-upload <CAPTIVE-PORTAL-NAME> [<MAC/HOSTNAME]|all]
{upload-time <TIME>}
captive-portal-page-upload <CAPTIVE-PORTAL-NAME> rf-domain [<DOMAIN-NAME]|all]
{from-controller} {(upload-time <TIME>)}
captive-portal-page-upload cancel-upload [<MAC/HOSTNAME]|all|on rf-domain
[<DOMAIN-NAME]|all]]
captive-portal-page-upload delete-file <CAPTIVE-PORTAL-NAME> <FILE-NAME>
captive-portal-page-upload load-file <CAPTIVE-PORTAL-NAME> <URL>

Parameters
- captive-portal-page-upload <CAPTIVE-PORTAL-NAME> [<MAC/HOSTNAME]|all]
{upload-time <TIME>}

<table>
<thead>
<tr>
<th>captive-portal-page-upload &lt;CAPTIVE-PORTAL-NAME&gt;</th>
<th>Uploads advanced pages specified by the <code>&lt;CAPTIVE-PORTAL-NAME&gt;</code> parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;CAPTIVE-PORTAL-NAME&gt;</code></td>
<td>Specify captive portal name (should be existing and configured).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><code>&lt;MAC/HOSTNAME&gt;</code></th>
<th>Uploads to a specified AP</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;MAC/HOSTNAME&gt;</code></td>
<td>Specify the AP’s MAC address or hostname.</td>
</tr>
</tbody>
</table>

| all | Uploads to all APs |

<table>
<thead>
<tr>
<th>upload-time <code>&lt;TIME&gt;</code></th>
<th>Optional. Schedules an upload time</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;TIME&gt;</code></td>
<td>Specify upload time in the MM/DD/YYYY-HH:MM or HH:MM format.</td>
</tr>
</tbody>
</table>

Note: The scheduled upload time is your local system’s time. It is not the access point, controller, service platform, or virtual controller time and it is not synched with the device.

Note: To view a list of uploaded captive portal files, execute the `show > captive-portal-page-upload > list-files <CAPTIVE-PORTAL-NAME>` command.
### captive-portal-page-upload `<CAPTIVE-PORTAL-NAME>` rf-domain [ `<DOMAIN-NAME>` | all ]

Uploads advanced pages specified by the `<CAPTIVE-PORTAL-NAME>` parameter

- `<CAPTIVE-PORTAL-NAME>` – Specify captive portal name (should be existing and configured).

| rf-domain [ `<DOMAIN-NAME>` | all ] |
|-----------------------------|
| Uploads to all APs within a specified RF Domain or all RF Domains |

- `<DOMAIN-NAME>` – Uploads to APs within a specified RF Domain. Specify the RF Domain name.
- all – Uploads to APs across all RF Domains

<table>
<thead>
<tr>
<th>from-controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional. Uploads to APs from the adopted device</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>upload-time <code>&lt;TIME&gt;</code></th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional. Schedules an AP upload</td>
</tr>
</tbody>
</table>

- `<TIME>` – Specify upload time in the MM/DD/YYYY-HH:MM or HH:MM format.

**Note:** The scheduled upload time is your local system’s time. It is not the access point, controller, service platform, or virtual controller time and it is not synched with the device.

### captive-portal-page-upload cancel-upload [ `<MAC/HOSTNAME>` | all | on rf-domain [ `<DOMAIN-NAME>` | all ] ]

Cancels a scheduled AP upload

| cancel-upload [ `<MAC/HOSTNAME>` | all | on rf-domain [ `<DOMAIN-NAME>` | all ] ] |
|---------------------------------------|
| Select one of the following options: |

- `<MAC/HOSTNAME>` – Cancels a scheduled upload to a specified AP. Specify the AP MAC address or hostname.
- all – Cancels all scheduled AP uploads
- on rf-domain – Cancels all scheduled uploads within a specified RF Domain or all RF Domains
  - `<DOMAIN-NAME>` – Cancels scheduled uploads within a specified RF Domain. Specify RF Domain name.
  - all – Cancels scheduled uploads across all RF Domains

### captive-portal-page-upload delete-file `<CAPTIVE-PORTAL-NAME>` `<FILE-NAME>`

Deletes a specified captive portal's uploaded captive-portal internal page files

<table>
<thead>
<tr>
<th>delete-file <code>&lt;CAPTIVE-PORTAL-NAME&gt;</code> <code>&lt;FILE-NAME&gt;</code></th>
</tr>
</thead>
<tbody>
<tr>
<td>Deletes a captive portal's, identified by the <code>&lt;CAPTIVE-PORTAL-NAME&gt;</code> keyword, uploaded internal page files</td>
</tr>
</tbody>
</table>

- `<CAPTIVE-PORTAL-NAME>` – Specify the captive portal’s name.
- `<FILE-NAME>` – Specify the file name. The specified internal captive portal page is deleted.

### captive-portal-page-upload load-file `<CAPTIVE-PORTAL-NAME>` `<URL>`

Loads captive-portal advanced pages

<table>
<thead>
<tr>
<th>load-file <code>&lt;CAPTIVE-PORTAL-NAME&gt;</code> <code>&lt;URL&gt;</code></th>
</tr>
</thead>
<tbody>
<tr>
<td>Loads captive-portal advanced pages</td>
</tr>
<tr>
<td><strong>&lt;CAPTIVE-PORTAL-NAME&gt; &lt;URL&gt;</strong></td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>• <strong>&lt;URL&gt;</strong> – Specifies location of the captive-portal's advanced pages. Use one of the following formats:</td>
</tr>
<tr>
<td><strong>IPv4 URLs:</strong></td>
</tr>
<tr>
<td>tftp://&lt;hostname</td>
</tr>
<tr>
<td>ftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td>sftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td>http://&lt;hostname</td>
</tr>
<tr>
<td>cf:/path/file</td>
</tr>
<tr>
<td>usb&lt;n&gt;:/path/file</td>
</tr>
<tr>
<td><strong>IPv6 URLs:</strong></td>
</tr>
<tr>
<td>tftp://&lt;hostname</td>
</tr>
<tr>
<td>ftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td>sftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td><strong>Note:</strong> The captive portal pages are downloaded to the controller from the location specified here. After downloading use the <code>captive-portal-page-upload &lt;CAPTIVE-PORTAL-NAME&gt; &lt;DEVICE-OR-DOMAIN-NAME&gt;</code> command to upload these pages to APs.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
ap6562-B1A214# captive-portal-page-upload load-file captive_portal_test tftp://89.89.89.17/pages_new_only.tar
```

```bash
ap6562-B1A214# show captive-portal-page-upload load-image-status
Download of captive_portal_test advanced page file is complete
```

```bash
ap6562-B1A214# captive-portal-page-upload captive_portal_test all
```

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-0A-81-B1-A2-14</td>
<td>Success</td>
<td>Added 6 APs to upload queue</td>
</tr>
</tbody>
</table>

```bash
ap6562-B1A214# show captive-portal-page-upload status
```

- Number of APs currently being uploaded: 1
- Number of APs waiting in queue to be uploaded: 0

```bash
ap6562-B1A214# show captive-portal-page-upload list-files CP-BW
```

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIZE</th>
<th>LAST MODIFIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP-BW-1.tar.gz</td>
<td>6133</td>
<td>2016-05-16 10:38:40</td>
</tr>
<tr>
<td>CP-BW.tar.gz</td>
<td>3370</td>
<td>2016-05-16 10:45:44</td>
</tr>
</tbody>
</table>

```bash
nx7500-7F2C13# show captive-portal-page-upload list-files CP-BW
```

```bash
nx7500-7F2C13#```
Privileged Exec Mode Commands

Changes the current directory

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
cd {<DIR>}
```

Parameters

- `cd {<DIR>}`
  
  `<DIR>` Optional. Changes the current directory to the directory identified by the `<DIR>` keyword. If a directory name is not provided, the system displays the current directory.

Examples

```
rfs7000-37FABE# cd flash:/log/
rfs7000-37FABE# pwd
flash:/log/
rfs7000-37FABE# pwd
```
3.1.5 change-passwd

Privileged Exec Mode Commands

Changes the password of a logged user. When this command is executed without any parameters, the password can be changed interactively.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

change-passwd \{<OLD-PASSWORD>\} <NEW-PASSWORD>

Parameters

- change-passwd \{<OLD-PASSWORD>\} <NEW-PASSWORD>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;OLD-PASSWORD&gt;</td>
<td>Optional. Specify the password to be changed.</td>
</tr>
<tr>
<td>&lt;NEW-PASSWORD&gt;</td>
<td>Specify the new password.</td>
</tr>
</tbody>
</table>

Note: The password can also be changed interactively. To do so, press [Enter] after the command.

Usage Guidelines

A password must be from 1 - 64 characters.

Examples

rfs7000-37FABE#change-passwd
Enter old password:
Enter new password:
Password for user 'admin' changed successfully
Please write this password change to memory\{write memory\} to be persistent.
rfs7000-37FABE#write memory
OK
rfs7000-37FABE#
### 3.1.6 clear

**Privileged Exec Mode Commands**

Clears parameters, cache entries, table entries, and other entries. The clear command is available for specific commands only. The information cleared using this command varies depending on the mode where the clear command is executed.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

---

**NOTE:** When using the `clear` command, refer to the interface details provided in Chapter 7, `interface`.

---

**Syntax**

```
clear [arp-cache|bonjour|cdp|counters|crypto|event-history|firewall|gre|ip|ipv6|
    l2tpv3-stats|license|lldp|logging|mac-address-table|mint|role|rtls|smart-cache|
    spanning-tree|traffic-shape|vrrp]
clear arp-cache {on <DEVICE-NAME>}
clear bonjour cache {on <DEVICE-NAME>}
clear [cdp|lldp] neighbors {on <DEVICE-NAME>}
clear counters [all|ap|bridge|interface|radio|router|thread|wireless-client]
clear counters [all|bridge|router|thread]
clear counters [ap|wireless-client] {<MAC>} {<MAC/OR-DOMAIN-NAME>}
clear counters interface [{INTERFACE-NAME=}|all|ge <1-4>|me1|port-channel <1-4|xge <1-4>
    vlan <1-4094>|wan1|vmif <1-X>xge <1-4>
    clear counters radio [{MAC/HOSTNAME=}|on]
clear counters radio [{MAC/HOSTNAME=}|<1-X>] {<DEVICE-OR-DOMAIN-NAME>}
clear crypto [ike|ipsec]
clear crypto ike sa [{IP=}|all] {on <DEVICE-NAME>}
clear crypto ipsec sa {on <DEVICE-NAME>}
clear event-history
clear firewall [dhcp snoop-table|dos stats|flows [ipv4|ipv6]|neighbors snoop-table]
    {on <DEVICE-NAME>}
clear gre stats {on <DEVICE-NAME>}
clear ip [bgp|dhcp|ospf]
clear ip bgp [{IP=}|all|external|process]
clear ip bgp [{IP=}|all|external] {in|on|out|soft}
clear ip bgp [{IP=}|all|external] {in prefix-filter} {on <DEVICE-NAME>}
clear ip bgp [{IP=}|all|external] {out} {<DEVICE-NAME>}
clear ip bgp [{IP=}|all|external] {soft {in|out}} {on <DEVICE-NAME>}
clear ip bgp process {on <DEVICE-NAME>}
clear ip dhcp bindings [{IP=}|all] {on <DEVICE-NAME>}
clear ip ospf process {on <DEVICE-NAME>}
clear ipv6 neighbor-cache {on <DEVICE-NAME>}
```
clear l2tpv3-stats tunnel <L2TPV3-TUNNEL-NAME> {session <SESSION-NAME>} 
{(on <DEVICE-NAME>)}

clear license [borrowed|lent]
clear license borrowed {on <DEVICE-NAME>}
clear license lent to <DEVICE-NAME> {on <DEVICE-NAME>}

clear logging {on <DEVICE-NAME>}

clear mac-address-table {address|interface|vlan} {on <DEVICE-NAME>}

clear mac-address-table {address <MAC>|vlan <1-4094>} {on <DEVICE-NAME>}
clear mac-address-table interface [<IF-NAME>|ge <1-X>|port-channel <1-X>|tel <1-4> <1-1>|up <1-X>|vmif <1-X>|xge <1-4>} {on <DEVICE-NAME>}

clear mint mlcp history {on <DEVICE-NAME>}

clear role ldap-stats {on <DEVICE-NAME>}

clear rtls [aeroscout|ekahau]
clear rtls [aeroscout|ekahau] {<MAC/DEVICE-NAME> {on <DEVICE-OR-DOMAIN-NAME>}}
on <DEVICE-OR-DOMAIN-NAME>

clear spanning-tree detected-protocols {interface|on <DEVICE-NAME>}
clear spanning-tree detected-protocols {interface [<INTERFACE-NAME>|ge <1-x>|me1|port-channel <1-x>|pppoe1|vlan <1-4094>|wwan1|vmif <1-X>|xge <1-4>} {on <DEVICE-NAME>}

clear traffic-shape statistics {class <1-4>} {(on <DEVICE-NAME>)}

clear vrrp [error-stats|stats] {on <DEVICE-NAME>}

The following clear command is specific to the NX45XX, NX65XX, and NX9XXX series service platforms:
clear smart-cache storage [all|url-regex <WORD>] {on <DEVICE-NAME>}

clear logging analytics {on <DEVICE-NAME>}

Parameters

• clear arp-cache {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>arp-cache</th>
<th>Clears Address Resolution Protocol (ARP) cache entries on a device. This protocol matches layer 3 IP addresses to layer 2 MAC addresses.</th>
</tr>
</thead>
</table>
| on <DEVICE-NAME>  | Optional. Clears ARP cache entries on a specified device  
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

• clear bonjour cache {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>bonjour cache</th>
<th>Clears all Bonjour cached statistics. Once cleared, the system has to re-discover available Bonjour services.</th>
</tr>
</thead>
</table>
| on <DEVICE-NAME>  | Optional. Clears all Bonjour cached statistics on a specified device  
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

• clear [cdp|lldp] neighbors {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>cdp</th>
<th>Clears Cisco Discovery Protocol (CDP) table entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>ldp</td>
<td>Clears Link Layer Discovery Protocol (LLDP) neighbor table entries</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>neighbors</code></td>
<td>Clears CDP or LLDP neighbor table entries based on the option selected in the preceding step</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Clears CDP or LLDP neighbor table entries on a specified device</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-NAME&gt;</code> – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td>`clear counters [all</td>
<td>bridge</td>
</tr>
<tr>
<td></td>
<td>• all – Clears all counters irrespective of the interface type</td>
</tr>
<tr>
<td></td>
<td>• bridge – Clears bridge counters</td>
</tr>
<tr>
<td></td>
<td>• router – Clears router counters</td>
</tr>
<tr>
<td></td>
<td>• thread – Clears per-thread counters</td>
</tr>
<tr>
<td>`clear counters [ap</td>
<td>wireless-client] {&lt;MAC&gt;} {(on &lt;DEVICE-OR-DOMAIN-NAME&gt;)}`</td>
</tr>
<tr>
<td></td>
<td>• ap – Clears access point wireless counters</td>
</tr>
<tr>
<td></td>
<td>• wireless-client – Clears wireless client counters</td>
</tr>
<tr>
<td><code>&lt;MAC&gt;</code></td>
<td>The following keyword is common to the ‘ap’ and ‘wireless-client’ parameters:</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;MAC&gt;</code> – Optional. Clears counters of the AP/wireless client identified by the <code>&lt;MAC&gt;</code> keyword.</td>
</tr>
<tr>
<td></td>
<td>Specify the MAC address of the AP or wireless client.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The system clears all AP or wireless client counters, if no MAC address is specified.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>The following keyword is recursive and is applicable to the <code>&lt;MAC&gt;</code> parameter:</td>
</tr>
<tr>
<td></td>
<td>• <code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Optional. Clears AP/wireless-client counters on a specified device or RF Domain</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Specify the name of the AP, wireless controller, service platform, or RF Domain</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> If no MAC address is specified, the system clears all AP or wireless client counters on the specified AP, wireless controller, service platform, or RF Domain.</td>
</tr>
<tr>
<td>`clear counters interface [&lt;INTERFACE-NAME&gt;</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;INTERFACE-NAME&gt;</code> – Clears a specified interface counters. Specify the interface name.</td>
</tr>
<tr>
<td></td>
<td>• all – Clears all interface counters</td>
</tr>
<tr>
<td></td>
<td>• <code>ge &lt;1-X&gt;</code> – Clears GigabitEthernet interface counters. Specify the GigabitEthernet interface index from 1 - X.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The number of Ethernet interfaces supported varies for different device types. For example, the NX45XX and NX65XX support 24 GE interfaces. Where as, RFS4000 supports 5 GE interfaces.</td>
</tr>
<tr>
<td></td>
<td>• me1 – Clears FastEthernet interface counters</td>
</tr>
<tr>
<td></td>
<td>• port-channel <code>&lt;1-X&gt;</code> – Clears port-channel interface counters. Specify the port channel interface index from 1 - X.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The number of port-channel interfaces supported varies for different device types. For example, the NX45XX and NX65XX support 13 port-channels. Where as, RFS4000 supports 3 port-channels.</td>
</tr>
</tbody>
</table>

Contd..
**clear counters radio**

- **<MAC/HOSTNAME> <1-X>**
  - Clears counters of a radio identified by the `<MAC/HOSTNAME>` keyword.
  - Optional. Specify the hostname or MAC address. Optionally, append the interface number to form radio ID in the form of AA-BB-CC-DD-EE-FF:RX or HOSTNAME:RX.
  - `<1-X>` – Optional. Specify the radio index (if not specified as part of the radio ID). The maximum number of radio antennas supported varies with the access point type.

**Note:** If no MAC address or radio index is specified, the system clears all radio counters.

- **on <DEVICE-OR-DOMAIN-NAME>**
  - The following keyword is recursive and is applicable to the `<MAC>` parameter:
  - Optional. Clears AP/wireless-client counters on a specified device or RF Domain.

**Note:** If no MAC address is specified, the system clears all AP or wireless client counters on the specified AP, wireless controller, service platform, or RF Domain.

**clear crypto ike sa**

- **<IP>|all**
  - Clears `Internet Key Exchange` (IKE) security associations (SAs)
  - `<IP>` – Clears IKE SAs for a certain peer
  - all – Clears IKE SAs for all peers

**Note:**<br>
Optional. Clears IKE SA entries, for a specified peer or all peers, on a specified device
- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

**clear crypto ipsec sa**

- **<DEVICE-NAME>**
  - Clears `Internet Protocol Security` (IPSec) database SAs
  - Optional. Clears IPSec SA entries on a specified device
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.
### clear event-history

| clear event-history | Clears event history cache entries |

### clear firewall [dhcp snoop-table|dos stats|flows [ipv4|ipv6]|neighbors snoop-table] {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>clear firewall</th>
<th>Clears firewall event entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcp snoop-table</td>
<td>Clears DHCP snoop table entries</td>
</tr>
<tr>
<td>dos stats</td>
<td>Clears denial of service statistics</td>
</tr>
<tr>
<td>flows [ipv4</td>
<td>ipv6]</td>
</tr>
<tr>
<td>neighbors snoop-table</td>
<td>Clears IPv6 neighbors snoop-table entries</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following keywords are common to the DHCP, DOS, and flows parameters:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Clears DHCP snoop table entries, denial of service statistics, or the established firewall sessions on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

### clear gre stats {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>clear gre stats</th>
<th>Clears GRE tunnel statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. GRE tunnel statistics on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

### clear ip bgp [<IP>|all|external] {in prefix-filter} {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>clear ip bgp</th>
<th>Clears BGP routing table information based on the option selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>[&lt;IP&gt;</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>• all – Clears Route Updates Received From All BGP Peers</td>
</tr>
<tr>
<td></td>
<td>• external – Clears route updates received from external BGP peers</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> This command is applicable only to the RFS4000, RFS6000, NX45XX, NX65XX, NX9000, and NX9600 series service platforms.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> In case of a change in routing policy it is necessary to clear BGP routing table entries in order for the new policy to take effect.</td>
</tr>
<tr>
<td>in prefix-filter</td>
<td>Optional. Clears soft-reconfiguration inbound route updates</td>
</tr>
<tr>
<td></td>
<td>• prefix-filter – Optional. Clears the existing Outbound Route Filtering (ORF) prefix-list.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears soft-reconfiguration inbound route updates on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP or service platform.</td>
</tr>
</tbody>
</table>
• clear ip bgp [<IP>|all|external] {out} {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear ip bgp</td>
<td>Clears BGP routing table information based on the option selected</td>
</tr>
</tbody>
</table>
| [<IP>|all|external] | - <IP> – Clears the BGP peer identified by the <IP> keyword. Specify the BGP peer’s IP address.  
- all – Clears route updates received from all BGP peers  
- external – Clears route updates received from external BGP peers  
| Note: | This command is applicable only to the RFS4000, RFS6000, NX45XX, NX65XX, and NX9000 series service platforms.  
| Note: | In case of a change in routing policy it is necessary to clear BGP routing table entries in order for the new policy to take effect. |
| out | Optional. Clears soft-reconfiguration outbound route updates. Optionally specify the device on which to execute this command. |
| on <DEVICE-NAME> | The following keyword is recursive and optional. |
| | - on <DEVICE-NAME> – Optional. Clears BGP sessions on a specified device  
| | - <DEVICE-NAME> – Specify the name of the AP or service platform. |

• clear ip bgp [<IP>|all|external] {soft {in|out}} {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear ip bgp</td>
<td>Clears BGP routing table information based on the option selected</td>
</tr>
</tbody>
</table>
| [<IP>|all|external] | - <IP> – Clears the BGP peer identified by the <IP> keyword. Specify the BGP peer’s IP address.  
- all – Clears route updates received from all BGP peers  
- external – Clears route updates received from external BGP peers  
| Note: | This command is applicable only to the RFS4000, RFS6000, NX45XX, NX65XX, and NX9000 series service platforms.  
| Note: | In case of a change in routing policy it is necessary to clear BGP routing table entries in order for the new policy to take effect. |
| soft {in|out} | Optional. Enables soft-reconfiguration of route updates for the specified IP address. This option allows routing tables to be reconfigured without clearing BGP sessions.  
| | - in – Optional. Enables soft reconfiguration of inbound route updates  
| | - out – Optional. Enables soft reconfiguration of outbound route updates  
| Note: | Modifications made to BGP settings (BGP access lists, weight, distance, route-maps, versions, routing policy, etc.) take effect only after on-going BGP sessions are cleared. The clear > ip > bgp command clears BGP sessions. To reduce loss of route updates during the process, use the ‘soft’ option. Soft reconfiguration stores inbound/outbound route updates to be processed later and updated to the routing table. This requires high memory usage. |
| on <DEVICE-NAME> | Optional. Clears soft-reconfiguration inbound/outbound route updates on a specified device  
| | - <DEVICE-NAME> – Specify the name of the AP or service platform. |

• clear ip bgp process {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear ip bgp</td>
<td>Clears all BGP processes running</td>
</tr>
</tbody>
</table>
| process | Note: This command is applicable only to the RFS4000, RFS6000, NX45XX, NX65XX, NX9000, NX9600 platforms.  
| on <DEVICE-NAME> | Optional. Clears all BGP processes on a specified device  
| | - <DEVICE-NAME> – Specify the name of the AP or service platform. |
- `clear ip dhcp bindings [<IP>|all] {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ip</code></td>
<td>Clears a Dynamic Host Configuration Protocol (DHCP) server’s IP address bindings entries</td>
</tr>
<tr>
<td><code>dhcp bindings</code></td>
<td>Clears DHCP server’s connections and address binding entries</td>
</tr>
<tr>
<td><code>&lt;IP&gt;</code></td>
<td>Clears specific address binding entries. Specify the IP address to clear binding entries.</td>
</tr>
<tr>
<td><code>all</code></td>
<td>Clears all address binding entries</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Clears a specified address binding or all address bindings on a specified device</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-NAME&gt;</code> – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

- `clear ip ospf process {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ip ospf process</code></td>
<td>Clears already enabled open shortest path first (OSPF) process and restarts the process</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Clears OSPF process on a specified device</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-NAME&gt;</code> – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

- `clear ipv6 neighbor-cache {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>clear ipv6 neighbor-cache</code></td>
<td>Clears IPv6 neighbor cache entries</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Clears IPv6 neighbor cache entries on a specified device</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-NAME&gt;</code> – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

- `clear l2tpv3-stats tunnel <L2TPV3-TUNNEL-NAME> {session <SESSION-NAME>} {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>l2tpv3-stats</code></td>
<td>Clears L2TPv3 tunnel session statistics</td>
</tr>
<tr>
<td><code>tunnel &lt;L2TPV3-TUNNEL-NAME&gt;</code></td>
<td>Clears all sessions associated with a specified L2TPv3 tunnel</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;L2TPV3-TUNNEL-NAME&gt;</code> – Specify the L2TPv3 tunnel name.</td>
</tr>
<tr>
<td><code>session &lt;SESSION-NAME&gt;</code></td>
<td>Optional. Clears a specified L2TPv3 tunnel session, identified by the &lt;SESSION-NAME&gt; keyword</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;SESSION-NAME&gt;</code> – Specify the session name.</td>
</tr>
</tbody>
</table>
## PRIVILEGED EXEC MODE COMMANDS 3-21

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear license borrowed {on &lt;DEVICE-NAME&gt;}</td>
<td>Releasess or revokes all licenses borrowed by a site controller. Specifies the borrowing controller's name.</td>
</tr>
<tr>
<td>clear license lent to &lt;DEVICE-NAME&gt; {on &lt;DEVICE-NAME&gt;}</td>
<td>NOC controller releases or revokes all licenses loaned to a site controller. Specifies the controller's name.</td>
</tr>
<tr>
<td>clear mac-address-table {address &lt;MAC&gt;</td>
<td>vlan &lt;1-4094&gt;} {on &lt;DEVICE-NAME&gt;}</td>
</tr>
<tr>
<td>clear mac-address-table interface [&lt;IF-NAME&gt;</td>
<td>ge &lt;1-X&gt;</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| `ge <1-X>` | Clears MAC address forwarding table for the specified GigabitEthernet interface  
  - `<1-X>` – Specify the GigabitEthernet interface index from 1 - X.  
  **Note:** The number of Ethernet interfaces supported varies for different device types. For example, the NX45XX and NX65XX support 24 GE interfaces. Where as, RFS4000 supports 5 GE interfaces. |
| `port-channel <1-X>` | Clears MAC address forwarding table for the specified port-channel interface  
  - `<1-X>` – Specify the port-channel interface index from 1 - X.  
  **Note:** The number of port-channel interfaces supported varies for different device types. For example, the NX45XX and NX65XX support 13 port-channels. Where as, RFS4000 supports 3 port-channels. |
| `t1e1 <1-4> <1-1>` | Clears MAC address forwarding table for the specified T1E1L interface  
  - `<1-4>` – Specify the T1E1 interface index from 1 - 4. A maximum of 4 slots are available. Select the slot to clear the MAC address forwarding table.  
  - `<1-1>` – Specify the T1E1 port ID from 1 - 1.  
  **Note:** The T1E1 interfaces are supported only on the NX45XX and NX65XX series service platforms. |
| `up <1-X>` | Clears MAC address forwarding table for the WAN Ethernet interface  
  **Note:** The number of WAN Ethernet interfaces supported varies for different devices. The RFS4000 and RFS6000 devices support 1 WAN Ethernet interface. The NX45XX supports 2 WAN Ethernet interfaces. |
| `vmif <1-X>` | Clears MAC address forwarding table for the VM interface  
  - `<1-X>` – Specify the VM interface index from 1 - X.  
  **Note:** The VMIF interfaces are supported only on the NX45XX, NX65XX, NX9500, NX9510, NX9600 series service platforms. The number of supported VMIFs varies for different device types. |
| `xge <1-4>` | Clears MAC address forwarding table for the specified TenGigabitEthernet interface  
  - `<1-4>` – Specify the GigabitEthernet interface index from 1 - 4.  
  **Note:** This interface is supported only on the NX9000 series service platforms. |
| `on <DEVICE-NAME>` | Optional. Clears the MAC address forwarding table, for the selected interface, on a specified device  
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform. |
| **clear mint mlcp history** **{on <DEVICE-NAME>**} | Clears MiNT related information |
| `mint` | Clears MiNT related information |
| `mlcp history` | Clears MiNT Link Creation Protocol (MLCP) client history |
| `on <DEVICE-NAME>` | Optional. Clears MLCP client history on a specified device  
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform. |
| **clear role ldap-stats** **{on <DEVICE-NAME>**} | Clears role based Lightweight Directory Access Protocol (LDAP) server statistics |
| `role ldap-stats` | Clears role based LDAP server statistics on a specified device  
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform. |
### clear rtls [aeroscout|ekahau] {<MAC/DEVICE-NAME> {on <DEVICE-OR-DOMAIN-NAME>}}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rtls</td>
<td>Clears Real Time Location Service (RTLS) statistics</td>
</tr>
<tr>
<td>aeroscout</td>
<td>Clears RTLS Aeroscout statistics</td>
</tr>
<tr>
<td>ekahau</td>
<td>Clears RTLS Ekahau statistics</td>
</tr>
</tbody>
</table>

#### <MAC/DEVICE-NAME>
- Optional. Clears Aeroscout or Ekahau RTLS statistics on a specified AP, wireless controller, or service platform. Specify the AP’s MAC address or hostname.

#### on <DEVICE-OR-DOMAIN-NAME>
- Optional. Clears Aeroscout or Ekahau RTLS statistics on a specified device or RF Domain.

### clear spanning-tree detected-protocols {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>spanning-tree</td>
<td>Clears spanning tree protocols on an interface, and also restarts protocol migration</td>
</tr>
<tr>
<td>detected-protocols</td>
<td>Restarts protocol migration</td>
</tr>
</tbody>
</table>

#### on <DEVICE-NAME>
- Optional. Clears spanning tree protocols on a specified device.

### clear spanning-tree detected-protocols {interface [<INTERFACE-NAME>|ge <1-X>|me1|port-channel <1-X>|pppoe1|vlan <1-4094>|wwan1|vmif <1-X>|xge <1-4>]} {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>spanning-tree</td>
<td>Clears spanning tree protocols on an interface and restarts protocol migration</td>
</tr>
<tr>
<td>detected-protocols</td>
<td>Restarts protocol migration</td>
</tr>
</tbody>
</table>

#### interface [<INTERFACE-NAME>|ge <1-X>|me1|port-channel <1-X>|pppoe1|vlan <1-4094>|wwan1|vmif <1-X>|xge <1-4>]
- Optional. Clears spanning tree entries on different interfaces.
  - <INTERFACE-NAME> – Clears detected spanning tree entries on a specified interface. Specify the interface name.
  - ge <1-X> – Clears detected spanning tree entries for the selected GigabitEthernet interface. Select the GigabitEthernet interface index from 1 - X.

**Note:** The number of Ethernet interfaces supported varies for different device types. For example, the NX45XX and NX65XX support 24 GE interfaces. Where as, RFS4000 supports 5 GE interfaces.
- me1 – Clears FastEthernet interface spanning tree entries
- port-channel <1-X> – Clears detected spanning tree entries for the selected port channel interface. Select the port channel index from 1 - X.

**Note:** The number of port-channel interfaces supported varies for different device types. For example, the NX45XX and NX65XX support 13 port-channels. Where as, RFS4000 supports 3 port-channels.
- pppoe1 – Clears detected spanning tree entries for PPPoE interface.
- vlan <1-4094> – Clears detected spanning tree entries for the selected VLAN interface. Select a SVI VLAN ID from 1 - 4094.

Contd..
### clear traffic-shape statistics

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>traffic-shape statistics</td>
<td>Clears traffic shaping statistics on a selected device.</td>
</tr>
<tr>
<td>class &lt;1-4&gt;</td>
<td>Optional. Clears traffic shaping statistics for a specific traffic class.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Specifies the name of the access point, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

#### Note:
If the traffic class is not specified, the system clears all traffic shaping statistics.

### clear vrrp [error-stats|stats] on <DEVICE-NAME>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vrrp</td>
<td>Clears Virtual Router Redundancy Protocol (VRRP) statistics for a device.</td>
</tr>
<tr>
<td>error-stats</td>
<td>Clears VRRP global error statistics on a selected device.</td>
</tr>
<tr>
<td>stats</td>
<td>Clears VRRP related statistics on a selected device.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Specifies the name of the access point, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

#### Note:
For more information on configuring traffic-shape, see [traffic-shape](#).

### clear smart-cache storage [all|url-regex <WORD>] on <DEVICE-NAME>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>smart-cache</td>
<td>Clears the smart-cache storage.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Specifies the name of the access point, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

#### Note:
Smart caching is a licensed service available on the NX45XX and NX65XX series service platforms. It allows the temporary storage of frequently accessed Web content (Web pages, graphics, audio and video files, etc.) on network infrastructure devices. When this content is requested, it is retrieved from a local content cache and not from the origin server. For more information on enabling content caching, see [smart-cache-policy](#).
storage [all|regex <WORD>]  Clears stored content based on the parameters passed  
  • all – Clears all cached content  
  • regex <WORD> – Clears only those URLs matching the specified expression  
  • <WORD> – Provide the URL in the following format: e.g. \(.xxx\)/\.+\.(flv|mp4)

on <DEVICE-NAME>  Optional. Clears stored content on a specified device  
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

Examples

rfs4000-229D58#clear crypto ike sa all
rfs4000-229D58#show crypto ike sa

<table>
<thead>
<tr>
<th>IDX</th>
<th>PEER</th>
<th>VERSION</th>
<th>ENCR ALGO</th>
<th>HASH ALGO</th>
<th>DH GROUP</th>
<th>IKE STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total IKE SAs: 0
rfs4000-229D58#

rfs7000-37FABE#clear spanning-tree detected-protocols interface port-channel 1
rfs7000-37FABE#clear ip dhcp bindings 172.16.10.9
rfs7000-37FABE#clear cdp neighbors
rfs4000-229D58#clear spanning-tree detected-protocols interface ge 1
rfs4000-229D58#clear lldp neighbors
rfs4000-229D58#show event-history

EVENT HISTORY REPORT
Generated on '2016-02-04 15:53:49 IST' by 'admin'

2016-02-04 15:53:26    rfs4000-880DA7  SYSTEM     LOGIN  Successfully
logged in user 'admin' with privilege 'superuser' from 'ssh'
2016-02-03 14:45:56    rfs4000-880DA7  SYSTEM     LOGOUT Logged out user
'admin' with privilege 'superuser' from '192.168.100.203'
2016-02-03 13:59:28    rfs4000-880DA7  SYSTEM     LOGIN  Successfully
logged in user 'admin' with privilege 'superuser' from 'ssh'
2016-02-02 17:06:51    rfs4000-880DA7  SYSTEM     LOGOUT Logged out user
'admin' with privilege 'superuser' from '192.168.100.150'
2016-02-02 17:06:41    rfs4000-880DA7  SYSTEM     LOGIN  Successfully
logged in user 'admin' with privilege 'superuser' from 'ssh'

rfs4000-229D58#

rfs4000-229D58#clear event-history

rfs4000-229D58#show event-history

EVENT HISTORY REPORT
Generated on '2016-02-04 15:55:11 IST' by 'admin'
rfs4000-229D58#
nx4500-5CFA2B# show mac-address-table

<table>
<thead>
<tr>
<th>BRIDGE</th>
<th>VLAN</th>
<th>PORT</th>
<th>MAC</th>
<th>STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-15-70-38-06-49</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-0F-8F-19-BA-4C</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>B4-C7-99-5C-FA-8E</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-15-70-81-74-2D</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-23-68-0F-43-D8</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-A0-F8-68-D5-64</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>B4-C7-99-6C-88-09</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>5C-0E-8B-18-10-91</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-02-B3-28-D1-55</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>3C-CE-73-F4-47-83</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-15-70-37-FD-F2</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>B4-C7-99-58-72-58</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>B4-C7-99-71-17-28</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-23-68-13-9B-34</td>
<td>forward</td>
</tr>
</tbody>
</table>

Total number of MACs displayed: **14**

nx4500-5CFA2B#

nx4500-5CFA2B# clear mac-address-table vlan 1

nx4500-5CFA2B# show mac-address-table

<table>
<thead>
<tr>
<th>BRIDGE</th>
<th>VLAN</th>
<th>PORT</th>
<th>MAC</th>
<th>STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-15-70-38-06-49</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-0F-8F-19-BA-4C</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>B4-C7-99-5C-FA-8E</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-15-70-81-74-2D</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-23-68-0F-43-D8</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>00-A0-F8-68-D5-64</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>B4-C7-99-6C-88-09</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>B4-C7-99-58-72-58</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>up1</td>
<td>B4-C7-99-71-17-28</td>
<td>forward</td>
</tr>
</tbody>
</table>

Total number of MACs displayed: **9**

nx4500-5CFA2B#
### 3.1.7 clock

**Privileged Exec Mode Commands**

Sets a device’s system clock. By default all WiNG devices are shipped with the time zone and time format set to UTC and 24-hour clock respectively. If a device’s clock is set without resetting the time zone, the time is displayed relative to the *Universal Time Coordinated* (UTC) – Greenwich Time. For example, San Jose is approximately 7 or 8 hours (depending on the time of the year) behind the UTC time. If the time at Greenwich, UK is 15:00:00 UTC, at San Jose it will display as 8:00:00 or 7:00:00 UTC. To display time in the local time zone format, in the device’s configuration mode, use the timezone command to reset the time zone. You can also reset the time zone at the RF Domain level. When configured as RF Domain setting, it applies to all devices within the domain. Configuring the local time zone prior to setting the clock is recommended. For more information on configuring RF Domain time zone, see `timezone`.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
clock set <HH:MM:SS> <1-31> <MONTH> <1993-2035> {on <DEVICE-NAME>}
```

**Parameters**

- `clock set <HH:MM:SS> <1-31> <MONTH> <1993-2035> {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;HH:MM:SS&gt;</code></td>
<td>Sets the current time (in military format hours, minutes and seconds)</td>
</tr>
<tr>
<td><strong>Note:</strong> By default the WiNG software displays time in the 24-hour clock format. This setting cannot be changed.</td>
<td></td>
</tr>
<tr>
<td><code>&lt;1-31&gt;</code></td>
<td>Sets the numerical day of the month</td>
</tr>
<tr>
<td><code>&lt;MONTH&gt;</code></td>
<td>Sets the month of the year from Jan - Dec</td>
</tr>
<tr>
<td><code>&lt;1993-2035&gt;</code></td>
<td>Sets a valid four digit year from 1993 - 2035</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Sets the clock on a specified device</td>
</tr>
<tr>
<td><strong>•</strong></td>
<td><strong>&lt;DEVICE-NAME&gt;</strong> – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

**Examples**

The following commands set the time zone and clock for the logged device:

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#timezone America/Los_Angeles
nx9500-6C8809#clock set 10:25:10 04 Feb 2016
nx9500-6C8809#show clock
2016-02-04 10:25:48 PST
nx9500-6C8809#
```

Note, if the clock is set without resetting the time zone, the time displays as UTC time as shown in the following example:

```
nx4500-5CFA2B#show clock
2015-09-08 06:19:34 UTC
nx4500-5CFA2B#
```
3.1.8 cluster

Privileged Exec Mode Commands

Initiates the cluster context. The cluster context provides centralized management to configure all cluster members from any one member. Commands executed under this context are executed on all members of the cluster.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
cluster start-election

Parameters
- cluster start-election

<table>
<thead>
<tr>
<th>start-election</th>
<th>Starts a new cluster master election</th>
</tr>
</thead>
</table>

Examples
rfs7000-37FABE#cluster start-election
rfs7000-37FABE#

Related Commands
- create-cluster | Creates a new cluster on a specified device
- join-cluster | Adds a controller, as cluster member, to an existing cluster of devices
3.1.9 configure

Privileged Exec Mode Commands

Enters the configuration mode. Use this command to enter the current device’s configuration mode, or enable configuration from the terminal.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

configure {self|terminal}

Parameters

- configure {self|terminal}

| self       | Optional. Enables the current device’s configuration mode |
| terminal   | Optional. Enables configuration from the terminal       |

Examples

rfs7000-37FABE#configure self
Enter configuration commands, one per line. End with CNTL/Z.
rfs7000-37FABE(config-device-00-15-70-37-FA-BE)#

rfs7000-37FABE#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
rfs7000-37FABE(config)#
### 3.1.10 connect

**Privileged Exec Mode Commands**

 Begins a console connection to a remote device using the remote device’s MiNT ID or name

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`connect [mint-id <MINT-ID>|<REMOTE-DEVICE-NAME>]`

**Parameters**

- `connect [mint-id <MINT-ID>|<REMOTE-DEVICE-NAME>]`

<table>
<thead>
<tr>
<th>mint-id &lt;MINT-ID&gt;</th>
<th>Connects to a remote system using the MiNT ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;MINT-ID&gt;</code> – Specify the remote device’s MiNT ID.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;REMOTE-DEVICE-NAME&gt;</th>
<th>Connects to a remote system using its name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;REMOTE-DEVICE-NAME&gt;</code> – Specify the remote device’s name.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-6DCD4B#show mint lsp-db
6 LSPs in LSP-db of 19.6D.CD.4B:
LSP 19.58.72.58 at level 1, hostname "ap5142-587258", 5 adjacencies, seqnum 748149
LSP 19.5C.FA.2B at level 1, hostname "nx4500-5CFA2B", 5 adjacencies, seqnum 337443
LSP 19.5C.FA.8E at level 1, hostname "nx4500-5CFA8E", 5 adjacencies, seqnum 333443
LSP 19.6C.88.09 at level 1, hostname "nx9500-6C8809", 5 adjacencies, seqnum 333247
LSP 19.6D.CD.4B at level 1, hostname "rfs7000-6DCD4B", 5 adjacencies, seqnum 152431
LSP 19.71.17.28 at level 1, hostname "ap8132-711728", 5 adjacencies, seqnum 363523
rfs7000-6DCD4B#connect mint-id 19.6C.88.09

Entering character mode
Escape character is '^]'.
```

```
x9500-6C8809 login:admin
Password:
```
3.11 copy

Privileged Exec Mode Commands

Copies a file (config, log, txt...etc) from any location to the access point, wireless controller, or service platform and vice-versa

NOTE: Copying a new config file to an existing running-config file merges it with the existing running-config file on the wireless controller. Both the existing running-config and the new config file are applied as the current running-config.

Copying a new config file to a start-up config file replaces the existing start-up config file with the parameters of the new file. It is better to erase the existing start-up config file and then copy the new config file to the startup config.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

copy [<SOURCE-FILE>|<SOURCE-URL>] [<DESTINATION-FILE>|<DESTINATION-URL>]

Parameters

- copy [<SOURCE-FILE>|<SOURCE-URL>] [<DESTINATION-FILE>|<DESTINATION-URL>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;SOURCE-FILE&gt;</td>
<td>Specify the source file to copy.</td>
</tr>
<tr>
<td>&lt;SOURCE-URL&gt;</td>
<td>Specify the source file’s location (URL).</td>
</tr>
<tr>
<td>&lt;DESTINATION-FILE&gt;</td>
<td>Specify the destination file to copy to.</td>
</tr>
<tr>
<td>&lt;DESTINATION-URL&gt;</td>
<td>Specify the destination file’s location (URL).</td>
</tr>
</tbody>
</table>

Examples

Transferring file snmpd.log to remote TFTP server.
rfs7000-37FABE#copy flash:/log/snmpd.log tftp://157.235.208.105:/snmpd.log

Accessing running-config file from remote TFTP server into switch running-config.
rfs7000-37FABE#copy tftp://157.235.208.105:/running-config running-config
### 3.1.12 cpe

**Privileged Exec Mode Commands**

Enables a WiNG controller to perform certain operations on *Customer Premises Equipment* (CPEs) through an adopted T5 controller.

A T5 controller uses the IPX operating system to manage its connected radio devices, as opposed to the WiNG operating system used by RFS wireless controllers and NX service platforms. However, a T5 controller, once enabled as a supported external device, can provide data to WiNG to assist in a T5’s management within a WiNG supported subnet populated by both types of devices. The CPEs are the T5 controller managed radio devices using the IPX operating system. These CPEs use a *Digital Subscriber Line* (DSL) as their high speed Internet access mechanism using the CPE’s physical wallplate connection and phone jack.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpe [boot</td>
<td>reload</td>
</tr>
<tr>
<td>cpe boot system cpe [&lt;1-24&gt;</td>
<td>all] [primary</td>
</tr>
<tr>
<td>cpe [&lt;1-24&gt;</td>
<td>all] {on &lt;T5-DEVICE-NAME&gt;}</td>
</tr>
<tr>
<td>cpe {reload</td>
<td>upgrade &lt;IMAGE-LOCATION&gt;} cpe [&lt;1-24&gt;</td>
</tr>
</tbody>
</table>

**Parameters**

- **cpe boot system cpe [<1-24>|all] [primary|secondary] {on <T5-DEVICE-NAME>}**
  - **Changes the image used by a CPE to boot. When reloading, the CPE uses the specified image.**
  - **Identifies the CPE(s) on which this change is implemented**
    - `<1-24>` – Reloads only those CPEs whose IDs have been specified. Specify the ID from 1 - 24.
    - `all` – Reloads all CPEs
  - **Select the next boot image**
    - `primary` – Uses the primary image when reloading
    - `secondary` – Uses the secondary image when reloading
  - **Optional. Performs this operation on a specified T5 device**
    - `<T5-DEVICE-NAME>` – Specify the T5 device’s hostname.

- **cpe {reload|upgrade <IMAGE-LOCATION>} cpe [<1-24>|all] {on <T5-DEVICE-NAME>}**
  - **Performs the following operations on CPEs**
    - `reload` – Reloads the device
    - `upgrade <IMAGE-LOCATION>` – Upgrades the device
    - `<IMAGE-LOCATION>` – Specify the location of the firmware image. Both IPv4 and IPv6 addresses are supported.
Use one of the following options to provide the location:
IPv4 URLs: tftp://<hostname|IP>[:port]/path/file
ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file
sftp://<user>:<passwd>@<hostname|IP>[:port]/path/file
http://<hostname|IP>[:port]/path/file
cf:/path/file
usb<n>:/path/file
IPv6 URLs: tftp://<hostname|IPv6>[:port]/path/file
ftp://<user>:<passwd>@<hostname|IPv6>[:port]/path/file
sftp://<user>:<passwd>@<hostname|IPv6>[:port]/path/file
http://<hostname|IPv6>[:port]/path/file
After specifying the operation to perform, identify the device(s).

cpe [<1-24>|all] Identifies the CPE(s) on which the operation is performed
• <1-24> – Configures the CPE’s ID from 1 - 24
• all – Configures all CPEs

on <T5-DEVICE-NAME> Optional. Performs this operation on a specified T5 device
• <T5-DEVICE-NAME> – Specify the T5 device’s hostname.

Examples
nx9500-6C8809#show t5 cpe boot on t5-ED7C6C

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>PRIMARY VERSION</th>
<th>SECONDARY VERSION</th>
<th>NEXT BOOT</th>
<th>UPGRADE STATUS</th>
<th>UPGRADE PROGRESS %</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpe1</td>
<td>5.4.2.0-010R</td>
<td>5.4.2.0-006B</td>
<td>primary</td>
<td>none</td>
<td>0</td>
</tr>
<tr>
<td>cpe2</td>
<td>5.4.2.0-010R</td>
<td>5.4.2.0-006B</td>
<td>primary</td>
<td>none</td>
<td>0</td>
</tr>
</tbody>
</table>

nx9500-6C8809#

nx9500-6C8809#cpe boot system cpe 1 secondary on t5-ED7C6C
Updated T5 CPE system boot partition
nx9500-6C8809#
3.1.13 create-cluster

Privileged Exec Mode Commands

Creates a new device cluster, with the specified name, and assigns it an IP address and routing level.

A cluster (or redundancy group) is a set of controllers or service platforms (nodes) uniquely defined by a profile configuration. Within the cluster, members discover and establish connections to other members and provide wireless network self-healing support in the event of member's failure.

A cluster’s load is typically distributed evenly amongst its members. An administrator needs to define how often the profile is load balanced for radio distribution, as radios can come and go and members join and exit the cluster.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

create-cluster name <CLUSTER-NAME> ip <IP> {level [1|2]}

Parameters

- create-cluster name <CLUSTER-NAME> ip <IP> {level [1|2]}

<table>
<thead>
<tr>
<th>create-cluster</th>
<th>Creates a cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>name &lt;CLUSTER-NAME&gt;</td>
<td>Configures the cluster name</td>
</tr>
<tr>
<td>• &lt;CLUSTER-NAME&gt; – Specify a cluster name. Define a name for the cluster name unique to its configuration or profile support requirements. The name cannot exceed 64 characters.</td>
<td></td>
</tr>
<tr>
<td>ip &lt;IP&gt;</td>
<td>Specifies the device’s IP address used for cluster creation</td>
</tr>
<tr>
<td>• &lt;IP&gt; – Specify the device’s IP address in the A.B.C.D format.</td>
<td></td>
</tr>
<tr>
<td>level [1</td>
<td>2]</td>
</tr>
<tr>
<td>• 1 – Configures level 1 (local) routing</td>
<td></td>
</tr>
<tr>
<td>• 2 – Configures level 2 (inter-site) routing</td>
<td></td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58#create-cluster name TechPubsLAN ip 192.168.13.8 level 2
... creating cluster
... committing the changes
... saving the changes
Please Wait .
[OK]
rfs4000-229D58#

rfs4000-229D58#show cluster configuration

Cluster Configuration Information
| Name | TechPubsLAN |
| Configured Mode | Active |
| Master Priority | 128 |
| Force configured state | Disabled |
| Force configured state delay | 5 minutes |
| Handle STP | Disabled |
| Radius Counter DB Sync Time | 5 minutes |

rfs4000-229D58#
rfs4000-229D58#show context
!
! Configuration of RFS4000 version 5.8.4.0-008D
!
! version 2.5
!
! firewall-policy default
  no ip dos tcp-sequence-past-window
  alg sip
!
! mint-policy global-default
  router packet priority 6
! radio-qos-policy default
!
! management-policy default
  telnet
  http server
  https server
  no ftp
--More--
rfs4000-229D58#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cluster</td>
<td>Initiates the cluster context. The cluster context provides centralized management to configure all cluster members from any one member.</td>
</tr>
<tr>
<td>join-cluster</td>
<td>Adds a wireless controller, access point, or service platform, as cluster member, to an existing cluster of devices</td>
</tr>
</tbody>
</table>
3.1.14 crypto

Privileged Exec Mode Commands

Enables digital certificate configuration and RSA Keypair management. Digital certificates are issued by CAs and contain user or device specific information, such as name, public key, IP address, serial number, company name, etc. Use this command to generate, delete, export, or import encrypted RSA Keypairs and generate Certificate Signing Request (CSR).

This command also enables trustpoint configuration. Trustpoints contain the CA’s identity and configuration parameters.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

crypto [key|pki]
crypto key [export|generate|import|zeroize]
crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL> {background|on|passphrase}
crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL> {background|passphrase <KEY-PASSPHRASE> background} {on <DEVICE-NAME>}
crypto key generate rsa <RSA-KEYPAIR-NAME> [2048|4096] {on <DEVICE-NAME>}
crypto key import rsa <RSA-KEYPAIR-NAME> <IMPORT-FROM-URL> {background|passphrase}
crypto key import rsa <RSA-KEYPAIR-NAME> <IMPORT-FROM-URL> {background|passphrase <KEY-PASSPHRASE> background} {on <DEVICE-NAME>}
crypto key zeroize rsa <RSA-KEYPAIR-NAME> {force} {on <DEVICE-NAME>}
crypto pki [authenticate|export|generate|import|zeroize]
crypto pki authenticate <TRUSTPOINT-NAME> <LOCATION-URL> {background}
{on <DEVICE-NAME>}
crypto pki export [request|trustpoint]
crypto pki export request [generate-rsa-key|short|use-rsa-key] <RSA-KEYPAIR-NAME>
{autogen-subject-name|subject-name}
crypto pki export request [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME>
autogen-subject-name <EXPORT-TO-URL>,email <SEND-TO-EMAIL>,fqdn <FQDN>,
ip-address <IP>
crypto pki export request [generate-rsa-key|short|generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME>
subject-name <COMMON-NAME> <COUNTRY> <STATE> <CITY>
<ORGANIZATION> <ORGANIZATION-UNIT> <EXPORT-TO-URL>,email <SEND-TO-EMAIL>,
fqdn <FQDN>,ip-address <IP>
crypto pki export trustpoint <TRUSTPOINT-NAME> <EXPORT-TO-URL> {background|passphrase <KEY-PASSPHRASE> background} {on <DEVICE-NAME>}
crypto pki generate self-signed <TRUSTPOINT-NAME> [generate-rsa-key|use-rsa-key]
<RSA-KEYPAIR-NAME> {autogen-subject-name|subject-name}
crypto pki generate self-signed <TRUSTPOINT-NAME> [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME>
autogen-subject-name <EMAIL> <SEND-TO-EMAIL>,
fqdn <FQDN>,ip-address <IP>,on <DEVICE-NAME>}
crypto pki generate self-signed <TRUSTPOINT-NAME> [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME>
subject-name <COMMON-NAME> <COUNTRY> <STATE> <CITY>
<ORGANIZATION> <ORGANIZATION-UNIT> {email <SEND-TO-EMAIL>,fqdn <FQDN>,
ip-address <IP>,on <DEVICE-NAME>}

crypto pki import [certificate|crl|trustpoint] 
{background} {(on <DEVICE-NAME>)}
crypto pki import [certificate|crl] <TRUSTPOINT-NAME> <IMPORT-FROM-URL>
{background} {(on <DEVICE-NAME>)}
crypto pki import trustpoint <TRUSTPOINT-NAME> <IMPORT-FROM-URL>
{background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}
crypto pki zeroize trustpoint <TRUSTPOINT-NAME> {del-key} {(on <DEVICE-NAME>)}

Parameters
- crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL> 
{background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}
- crypto key generate rsa <RSA-KEYPAIR-NAME> [2048|4096] 
{on <DEVICE-NAME>}
- crypto key import rsa <RSA-KEYPAIR-NAME> <IMPORT-FROM-URL> 
{background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}

<table>
<thead>
<tr>
<th>key</th>
<th>Enables RSA Keypair management. Use this command to export, import, generate, or delete a RSA key.</th>
</tr>
</thead>
</table>
| export rsa <RSA-KEYPAIR-NAME> | Exports an existing RSA Keypair to a specified destination
|  | • <RSA-KEYPAIR-NAME> – Specify the RSA Keypair name. |
| <EXPORT-TO-URL> | Specify the RSA Keypair destination address. Both IPv4 and IPv6 address formats are supported.
|  | After specifying the destination address (where the RSA keypair is exported), configure one of the following parameters: background or passphrase. |
| background | Optional. Performs export operation in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the export on. |
| passphrase <KEY-PASSPHRASE> background | Optional. Encrypts RSA Keypair before exporting
|  | • <KEY-PASSPHRASE> – Specify a passphrase to encrypt the RSA keypair.
|  | • background – Optional. Performs export operation in the background. After specifying the passphrase, optionally specify the device (access point or controller) to perform the export on. |
| on <DEVICE-NAME> | The following parameter is recursive and common to all of the above parameters:
|  | • on <DEVICE-NAME> – Optional. Performs export operation on a specified device
|  | • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

- crypto key generate rsa <RSA-KEYPAIR-NAME> [2048|4096] 
{on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>key</th>
<th>Enables RSA Keypair management. Use this command to export, import, generate, or delete a RSA key.</th>
</tr>
</thead>
</table>
| generate rsa <RSA-KEYPAIR-NAME> [2048|4096] | Generates a new RSA Keypair
|  | • <RSA-KEYPAIR-NAME> – Specify the RSA Keypair name.
|  | • [2048|4096] – Sets the size of the RSA key in bits. The options are 2048 bits and 4096 bits. The default size is 2048 bits.
|  | After specifying the key size, optionally specify the device (access point or controller) to generate the key on. |
| on <DEVICE-NAME> | Optional. Generates the new RSA Keypair on a specified device
|  | • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

- crypto key import rsa <RSA-KEYPAIR-NAME> <IMPORT-FROM-URL> 
{background|passphrase <KEY-PASSPHRASE> background} {(on <DEVICE-NAME>)}

<p>| key | Enables RSA Keypair management. Use this command to export, import, generate, or delete a RSA key. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>import rsa</strong></td>
<td>Imports a RSA Keypair from a specified source</td>
</tr>
<tr>
<td><code>&lt;RSA-KEYPAIR-NAME&gt;</code></td>
<td>• <code>&lt;RSA-KEYPAIR-NAME&gt;</code> – Specify the RSA Keypair name.</td>
</tr>
<tr>
<td><code>&lt;IMPORT-FROM-URL&gt;</code></td>
<td>Specify the RSA Keypair source address. Both IPv4 and IPv6 address formats are supported. After specifying the source address (where the RSA Keypair is imported from), configure one of the following parameters: background or passphrase.</td>
</tr>
<tr>
<td><strong>background</strong></td>
<td>Optional. Performs import operation in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the import on.</td>
</tr>
<tr>
<td><strong>passphrase</strong></td>
<td>Optional. Decrypts the RSA Keypair after importing</td>
</tr>
<tr>
<td><code>&lt;KEY-PASSPHRASE&gt;</code></td>
<td>• <code>&lt;KEY-PASSPHRASE&gt;</code> – Specify the passphrase to decrypt the RSA keypair.</td>
</tr>
<tr>
<td><strong>on &lt;DEVICE-NAME&gt;</strong></td>
<td>The following parameter is recursive and common to the ‘background’ and ‘passphrase’ keywords:</td>
</tr>
<tr>
<td></td>
<td>• on <code>&lt;DEVICE-NAME&gt;</code> – Optional. Performs import operation on a specific device</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-NAME&gt;</code> – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td><strong>key</strong></td>
<td>Enables RSA Keypair management. Use this command to export, import, generate, or delete a RSA key.</td>
</tr>
<tr>
<td><strong>zeroize rsa</strong></td>
<td>Deletes a specified RSA Keypair</td>
</tr>
<tr>
<td><code>&lt;RSA-KEYPAIR-NAME&gt;</code></td>
<td>• <code>&lt;RSA-KEYPAIR-NAME&gt;</code> – Specify the RSA Keypair name.</td>
</tr>
<tr>
<td><strong>force</strong></td>
<td>Optional. Forces deletion of all certificates associated with the specified RSA Keypair. Optionally specify a device on which to force certificate deletion.</td>
</tr>
<tr>
<td><strong>on &lt;DEVICE-NAME&gt;</strong></td>
<td>The following parameter is recursive and optional:</td>
</tr>
<tr>
<td></td>
<td>• on <code>&lt;DEVICE-NAME&gt;</code> – Optional. Deletes all certificates associated with the RSA Keypair on a specified device</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-NAME&gt;</code> – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td><strong>pki</strong></td>
<td>Enables Private Key Infrastructure (PKI) management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated Certificate Authority (CA) certificates.</td>
</tr>
<tr>
<td><strong>authenticate</strong></td>
<td>Authenticates a trustpoint and imports the corresponding CA certificate</td>
</tr>
<tr>
<td><code>&lt;TRUSTPOINT-NAME&gt;</code></td>
<td>• <code>&lt;TRUSTPOINT-NAME&gt;</code> – Specify the trustpoint name.</td>
</tr>
<tr>
<td><code>&lt;URL&gt;</code></td>
<td>Specify CA's location. Both IPv4 and IPv6 address formats are supported.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>The CA certificate is imported from the specified location.</td>
</tr>
<tr>
<td><strong>background</strong></td>
<td>Optional. Performs authentication in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the authentication on.</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| **on <DEVICE-NAME>** | The following parameter is recursive and optional:  
• on <DEVICE-NAME> – Optional. Performs authentication on a specified device  
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| **crypto pki export request [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME> autogen-subject-name (<EXPORT-TO-URL>,email <SEND-TO-EMAIL>,fqdn <FQDN>,ip-address <IP>)** | |
| **pki** | Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates. |
| **export request** | Exports CSR to the CA for digital identity certificate. The CSR contains applicant’s details and RSA Keypair’s public key. |
| **[generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME>** | Generates a new RSA Keypair or uses an existing RSA Keypair  
• generate-rsa-key – Generates a new RSA Keypair for digital authentication  
• use-rsa-key – Uses an existing RSA Keypair for digital authentication  
• <RSA-KEYPAIR-NAME> – If generating a new RSA Keypair, specify a name for it. If using an existing RSA Keypair, specify its name. |
| **autogen-subject-name** | Auto generates subject name from configuration parameters. The subject name identifies the certificate. |
| **<EXPORT-TO-URL>** | Specify the CA’s location. Both IPv4 and IPv6 address formats are supported.  
**Note:** The CSR is exported to the specified location. |
| **email <SEND-TO-EMAIL>** | Exports CSR to a specified e-mail address  
• <SEND-TO-EMAIL> – Specify the CA’s e-mail address. |
| **fqdn <FQDN>** | Exports CSR to a specified *Fully Qualified Domain Name* (FQDN)  
• <FQDN> – Specify the CA’s FQDN. |
| **ip-address <IP>** | Exports CSR to a specified device or system  
• <IP> – Specify the CA’s IP address. |
<p>| <strong>crypto pki export request [generate-rsa-key|short [generate-rsa-key|use-rsa-key]| use-rsa-key] &lt;RSA-KEYPAIR-NAME&gt; subject-name &lt;COMMON-NAME&gt; &lt;COUNTRY&gt; &lt;STATE&gt; &lt;CITY&gt; &lt;ORGANIZATION&gt; &lt;ORGANIZATION-UNIT&gt; (&lt;EXPORT-TO-URL&gt;,email &lt;SEND-TO-EMAIL&gt;,fqdn &lt;FQDN&gt;, ip-address &lt;IP&gt;)</strong> | |
| <strong>pki</strong> | Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates. |
| <strong>export request</strong> | Exports CSR to the CA for a digital identity certificate. The CSR contains applicant’s details and RSA Keypair’s public key. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>[generate-rsa-key]</strong></td>
<td>Generates a new RSA Keypair or uses an existing RSA Keypair</td>
</tr>
<tr>
<td>short [generate-rsa-key] [use-rsa-key]</td>
<td>• <code>generate-rsa-key</code> – Generates a new RSA Keypair for digital authentication</td>
</tr>
<tr>
<td>use-rsa-key</td>
<td>• short [generate-rsa-key][use-rsa-key] – Generates and exports a shorter version of the CSR</td>
</tr>
<tr>
<td>&lt;RSA-KEYPAIR-NAME&gt;</td>
<td>• <code>generate-rsa-key</code> – Generates a new RSA Keypair for digital authentication. If generating a new RSA Keypair, specify a name for it.</td>
</tr>
<tr>
<td></td>
<td>• <code>use-rsa-key</code> – Uses an existing RSA Keypair for digital authentication. If using an existing RSA Keypair, specify its name.</td>
</tr>
<tr>
<td></td>
<td>• <code>use-rsa-key</code> – Uses an existing RSA Keypair for digital authentication</td>
</tr>
<tr>
<td></td>
<td>• &lt;RSA-KEYPAIR-NAME&gt; – If generating a new RSA Keypair, specify a name for it. If using an existing RSA Keypair, specify its name.</td>
</tr>
<tr>
<td><strong>subject-name</strong></td>
<td>Configures a subject name, defined by the <code>&lt;COMMON-NAME&gt;</code> keyword, to identify the certificate</td>
</tr>
<tr>
<td>&lt;COMMON-NAME&gt;</td>
<td>• <code>&lt;COMMON-NAME&gt;</code> – Specify the common name used with the CA certificate. The name should enable you to identify the certificate easily (2 to 64 characters in length).</td>
</tr>
<tr>
<td><strong>&lt;COUNTRY&gt;</strong></td>
<td>Sets the deployment country code (2 character ISO code)</td>
</tr>
<tr>
<td><strong>&lt;STATE&gt;</strong></td>
<td>Sets the state name (2 to 64 characters in length)</td>
</tr>
<tr>
<td><strong>&lt;CITY&gt;</strong></td>
<td>Sets the city name (2 to 64 characters in length)</td>
</tr>
<tr>
<td><strong>&lt;ORGANIZATION&gt;</strong></td>
<td>Sets the organization name (2 to 64 characters in length)</td>
</tr>
<tr>
<td><strong>&lt;ORGANIZATION-UNIT&gt;</strong></td>
<td>Sets the organization unit (2 to 64 characters in length)</td>
</tr>
<tr>
<td><strong>&lt;EXPORT-TO-URL&gt;</strong></td>
<td>Specify the CA's location. Both IPv4 and IPv6 address formats are supported. The CSR is exported to the specified location.</td>
</tr>
<tr>
<td><strong>email</strong></td>
<td>Exports CSR to a specified e-mail address</td>
</tr>
<tr>
<td>&lt;SEND-TO-EMAIL&gt;</td>
<td>• <code>&lt;SEND-TO-EMAIL&gt;</code> – Specify the CA's e-mail address.</td>
</tr>
<tr>
<td><strong>fqdn</strong></td>
<td>Exports CSR to a specified FQDN</td>
</tr>
<tr>
<td>&lt;FQDN&gt;</td>
<td>• <code>&lt;FQDN&gt;</code> – Specify the CA's FQDN.</td>
</tr>
<tr>
<td><strong>ip-address</strong></td>
<td>Exports CSR to a specified device or system</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>• <code>&lt;IP&gt;</code> – Specify the CA's IP address.</td>
</tr>
<tr>
<td><strong>crypto pki export trustpoint</strong></td>
<td>Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates.</td>
</tr>
<tr>
<td><strong>&lt;TRUSTPOINT-NAME&gt;</strong></td>
<td>Exports a trustpoint along with CA certificate, <em>Certificate Revocation List</em> (CRL), server certificate, and private key</td>
</tr>
<tr>
<td><strong>&lt;EXPORT-TO-URL&gt;</strong></td>
<td>Specify the destination address. Both IPv4 and IPv6 address formats are supported. The trustpoint is exported to the address specified here.</td>
</tr>
<tr>
<td><strong>background</strong></td>
<td>Optional. Performs export operation in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the export on.</td>
</tr>
</tbody>
</table>
PRIVILEGED EXEC MODE COMMANDS 3-41

<table>
<thead>
<tr>
<th>passphrase</th>
<th>Optional. Encrypts the key with a passphrase before exporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;KEY-PASSPHRASE&gt;</td>
<td>• &lt;KEY-PASSPHRASE&gt; – Specify the passphrase to encrypt the trustpoint.</td>
</tr>
<tr>
<td>background</td>
<td>• background – Optional. Performs export operation in the background. After specifying the passphrase, optionally specify the device (access point or controller) to perform the export on.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>on &lt;DEVICE-NAME&gt;</th>
<th>The following parameter is recursive and common to the 'background' and 'passphrase' keywords:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• on &lt;DEVICE-NAME&gt;</td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Performs export operation on a specified device</td>
</tr>
<tr>
<td>• &lt;DEVICE-NAME&gt;</td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

• **crypto pki generate self-signed <TRUSTPOINT-NAME>** [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME> autogen-subject-name {(email <SEND-TO-EMAIL>,fqdn <FQDN>,ip-address <IP>,on <DEVICE-NAME>)}

<table>
<thead>
<tr>
<th>pki</th>
<th>Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated certificates.</th>
</tr>
</thead>
<tbody>
<tr>
<td>generate</td>
<td>Generates a certificate and a trustpoint</td>
</tr>
<tr>
<td>self-signed</td>
<td>Generates a self-signed certificate and a trustpoint</td>
</tr>
<tr>
<td>&lt;TRUSTPOINT-NAME&gt;</td>
<td>• &lt;TRUSTPOINT-NAME&gt; – Specify a name for the certificate and its trustpoint.</td>
</tr>
<tr>
<td>[generate-rsa-key</td>
<td>use-rsa-key]</td>
</tr>
<tr>
<td>&lt;RSA-KEYPAIR-NAME&gt;</td>
<td>• generate-rsa-key – Generates a new RSA Keypair for digital authentication</td>
</tr>
<tr>
<td></td>
<td>• use-rsa-key – Uses an existing RSA Keypair for digital authentication</td>
</tr>
<tr>
<td></td>
<td>• &lt;RSA-KEYPAIR-NAME&gt; – If generating a new RSA Keypair, specify a name for it. If using an existing RSA Keypair, specify its name.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>autogen-subject-name</th>
<th>Auto generates the subject name from the configuration parameters. The subject name helps to identify the certificate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;EMAIL&gt;</td>
<td>Optional. Exports the self-signed certificate to a specified e-mail address</td>
</tr>
<tr>
<td>• &lt;EMAIL&gt;</td>
<td>• &lt;EMAIL&gt; – Specify the e-mail address.</td>
</tr>
<tr>
<td>&lt;FQDN&gt;</td>
<td>Optional. Exports the self-signed certificate to a specified FQDN</td>
</tr>
<tr>
<td>• &lt;FQDN&gt;</td>
<td>• &lt;FQDN&gt; – Specify the FQDN.</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>Optional. Exports the self-signed certificate to a specified device or system</td>
</tr>
<tr>
<td>• &lt;IP&gt;</td>
<td>• &lt;IP&gt; – Specify the device’s IP address.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Exports the self-signed certificate on a specified device</td>
</tr>
<tr>
<td>• &lt;DEVICE-NAME&gt;</td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

• **crypto pki generate self-signed <TRUSTPOINT-NAME>** [generate-rsa-key|use-rsa-key] <RSA-KEYPAIR-NAME> subject-name <COMMON-NAME> <COUNTRY> <STATE> <CITY> <ORGANIZATION> <ORGANIZATION-UNIT> {(email <SEND-TO-EMAIL>,fqdn <FQDN>,ip-address <IP>,on <DEVICE-NAME>)}

<table>
<thead>
<tr>
<th>pki</th>
<th>Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated certificates.</th>
</tr>
</thead>
<tbody>
<tr>
<td>generate self-signed</td>
<td>Generates a self-signed certificate and a trustpoint</td>
</tr>
<tr>
<td>&lt;TRUSTPOINT-NAME&gt;</td>
<td>• &lt;TRUSTPOINT-NAME&gt; – Specify a name for the certificate and its trustpoint.</td>
</tr>
<tr>
<td>command</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>[generate-rsa-key]</td>
<td>Generates a new RSA Keypair, or uses an existing RSA Keypair</td>
</tr>
<tr>
<td>use-rsa-key</td>
<td>• generate-rsa-key – Generates a new RSA Keypair for digital authentication</td>
</tr>
<tr>
<td>&lt;RSA-KEYPAIR-NAME&gt;</td>
<td>• use-rsa-key – Uses an existing RSA Keypair for digital authentication</td>
</tr>
<tr>
<td></td>
<td>• &lt;RSA-KEYPAIR-NAME&gt; – If generating a new RSA Keypair, specify a name for it. If using an existing RSA Keypair, specify its name.</td>
</tr>
<tr>
<td>subject-name</td>
<td>Configures a subject name, defined by the &lt;COMMON-NAME&gt; keyword, to identify the certificate</td>
</tr>
<tr>
<td>&lt;COMMON-NAME&gt;</td>
<td>• &lt;COMMON-NAME&gt; – Specify the common name used with this certificate. The name should enable you to identify the certificate easily and should not exceed 2 to 64 characters in length.</td>
</tr>
<tr>
<td>&lt;COUNTRY&gt;</td>
<td>Sets the deployment country code (2 character ISO code)</td>
</tr>
<tr>
<td>&lt;STATE&gt;</td>
<td>Sets the state name (2 to 64 characters in length)</td>
</tr>
<tr>
<td>&lt;CITY&gt;</td>
<td>Sets the city name (2 to 64 characters in length)</td>
</tr>
<tr>
<td>&lt;ORGANIZATION&gt;</td>
<td>Sets the organization name (2 to 64 characters in length)</td>
</tr>
<tr>
<td>&lt;ORGANIZATION-UNIT&gt;</td>
<td>Sets the organization unit (2 to 64 characters in length)</td>
</tr>
<tr>
<td>email</td>
<td>Optional. Exports the self-signed certificate to a specified e-mail address</td>
</tr>
<tr>
<td>&lt;SEND-TO-EMAIL&gt;</td>
<td>• &lt;SEND-TO-EMAIL&gt; – Specify the e-mail address.</td>
</tr>
<tr>
<td>fqdn</td>
<td>Optional. Exports the self-signed certificate to a specified FQDN</td>
</tr>
<tr>
<td>&lt;FQDN&gt;</td>
<td>• &lt;FQDN&gt; – Specify the FQDN.</td>
</tr>
<tr>
<td>ip-address</td>
<td>Optional. Exports the self-signed certificate to a specified device or system</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>• &lt;IP&gt; – Specify the device’s IP address.</td>
</tr>
<tr>
<td>crypto pki import [certificate</td>
<td>crl] &lt;TRUSTPOINT-NAME&gt; &lt;IMPORT-FROM-URL&gt; {background} {(on &lt;DEVICE-NAME&gt;)}</td>
</tr>
<tr>
<td>pki</td>
<td>Imports certificates, Certificate Revocation List (CRL), or a trustpoint to the selected device</td>
</tr>
<tr>
<td>import</td>
<td>Imports certificates, Certificate Revocation List (CRL), or a trustpoint to the selected device</td>
</tr>
<tr>
<td>[certificate</td>
<td>crl] &lt;TRUSTPOINT-NAME&gt;</td>
</tr>
<tr>
<td></td>
<td>• certificate – Imports signed server certificate</td>
</tr>
<tr>
<td></td>
<td>• crl – Imports CRL</td>
</tr>
<tr>
<td></td>
<td>• &lt;TRUSTPOINT-NAME&gt; – Specify the trustpoint name (should be authenticated).</td>
</tr>
<tr>
<td>&lt;IMPORT-FROM-URL&gt;</td>
<td>Specify the signed server certificate or CRL source address. Both IPv4 and IPv6 address formats are supported.</td>
</tr>
<tr>
<td></td>
<td>The server certificate or the CRL (based on the parameter passed in the preceding step) is imported from the location specified here.</td>
</tr>
<tr>
<td>background</td>
<td>Optional. Performs import operation in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the import on.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following parameter is recursive and optional:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Performs import operation on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>
• crypto pki import trustpoint <TRUSTPOINT-NAME> <IMPORT-FROM-URL> {background|passphrase <KEY-PASSPHRASE> background} {on <DEVICE-NAME>}

pki Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates.

import Imports certificates, CRL, or a trustpoint to the selected device.

trustpoint <TRUSTPOINT-NAME> Imports a trustpoint and its associated CA certificate, server certificate, and private key

• <TRUSTPOINT-NAME> – Specify the trustpoint name (should be authenticated).

<IMPORT-FROM-URL> Specify the trustpoint source address. Both IPv4 and IPv6 address formats are supported.

background Optional. Performs import operation in the background. If selecting this option, you can optionally specify the device (access point or controller) to perform the export on.

passphrase <KEY-PASSPHRASE> background Optional. Decrypts trustpoint with a passphrase after importing

• <KEY-PASSPHRASE> – Specify the passphrase. After specifying the passphrase, optionally specify the device to perform import on.

• background – Optional. Performs import operation in the background. After specifying the passphrase, optionally specify the device (access point or controller) to perform the import on.

on <DEVICE-NAME> The following parameter is recursive and optional:

• on <DEVICE-NAME> – Optional. Performs import operation on a specified device

• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

• crypto pki zeroize trustpoint <TRUSTPOINT-NAME> {del-key} {on <DEVICE-NAME>}

pki Enables PKI management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates.

zeroize trustpoint <TRUSTPOINT-NAME> Deletes a trustpoint and its associated CA certificate, server certificate, and private key

• <TRUSTPOINT-NAME> – Specify the trustpoint name (should be authenticated).

del-key Optional. Deletes the private key associated with the server certificate. Optionally specify the device to perform deletion on.

on <DEVICE-NAME> The following parameter is recursive and optional:

• on <DEVICE-NAME> – Optional. Deletes the trustpoint on a specified device

• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

Usage Guidelines
The system supports both IPv4 and IPv6 address formats. Provide source and destination locations using any one of the following options:

• IPv4 URLs:
  tftp://<hostname>[::port]/path/file
  ftp://<user>:<passwd>@<hostname>[::port]/path/file
  sftp://<user>@<hostname>[::port]/path/file
  http://<hostname>[::port]/path/file
  cf://path/file
usb<n>:/path/file

- IPv6 URLs:
  - tftp://<hostname[[IPv6]][:port]/path/file
  - ftp://<user>:<passwd>@<hostname[[IPv6]][:port]/path/file
  - sftp://<user>:<passwd>@<hostname[[IPv6]][:port]>/path/file
  - http://<hostname[[IPv6]][:port]/path/file

Examples

rfs7000-37FABE#crypto key generate rsa key 1025
RSA Keypair successfully generated
rfs7000-37FABE#

rfs7000-37FABE#crypto key import rsa test123 url passphrase word background
RSA key import operation is started in background
rfs7000-37FABE#

rfs7000-37FABE#crypto pki generate self-signed word generate-rsa-key word autogen-subject-name fqdn word
Successfully generated self-signed certificate
rfs7000-37FABE#

rfs7000-37FABE#crypto pki zeroize trustpoint word del-key
Successfully removed the trustpoint and associated certificates
%Warning: Applications associated with the trustpoint will start using default-trustpoint
rfs7000-37FABE#

rfs7000-37FABE#crypto pki authenticate word url background
Import of CA certificate started in background
rfs7000-37FABE#

rfs7000-37FABE#crypto pki import trustpoint word url passphrase word
Import operation started in background
rfs7000-37FABE#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes server certificates, trustpoints and their associated certificates</td>
</tr>
</tbody>
</table>
3.1.15  crypto-cmp-cert-update

Privileged Exec Mode Commands

Triggers a Certificate Management Protocol (CMP) certificate update on a specified device or devices.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

crypto-cmp-cert-update <TRUSTPOINT-NAME> {on <DEVICE-NAME>}

Parameters

- crypto-cmp-cert-update <TRUSTPOINT-NAME> {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>crypto-cmp-cert-update &lt;TRUSTPOINT-NAME&gt; {on &lt;DEVICE-NAME&gt;}</th>
<th>Triggers a CMP certificate update on a specified device or devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;TRUSTPOINT-NAME&gt; – Specify the target trustpoint name. A trustpoint represents a CA/identity pair containing the identity of the CA, CA specific configuration parameters, and an association with an enrolled identity certificate. Use the crypto-cmp-policy context to configure the trustpoint.</td>
<td></td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt; – Optional. Triggers a CMP certificate update and response on a specified device or devices. Specify the name of the AP, wireless controller, or service platform. Multiple devices can be provided as a comma separated list.</td>
<td></td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
<td></td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58#crypto-cmp-cert-update test on B4-C7-99-71-17-28
CMP Cert update success
rfs4000-229D58#
3.1.16 database

Privileged Exec Mode Commands

Enables automatic repairing (vacuuming) and dropping of databases (Captive-portal and NSight). Vacuuming a database refers to the process of finding and reclaiming space left over from previous DELETE statements. Supported in the following platforms:
  • Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax

database [drop|repair]
database drop [all|captive-portal|nsight]
database repair {on <DEVICE-NAME>}

Parameters

- database drop [all|captive-portal|nsight]
- database repair {on <DEVICE-NAME>}

Examples

nx9500-6C8809#database repair on nx9500-6C8809
nx9500-6C8809#

Related Commands

database-backup | Backs up captive-portal and/or NSight database to a specified location and file on an FTP or SFTP server

database-restore | Restores a previously exported database [captive-portal and/or NSight]
### 3.1.17 database-backup

*Privileged Exec Mode Commands*

Backs up captive-portal and/or NSight database to a specified location and file on an FTP or SFTP server

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600

**Syntax**

database-backup database [captive-portal|nsight] <URL>

**Parameters**
- database-backup database [captive-portal|nsight] <URL>

| database-backup database [captive-portal|nsight] | Backs up captive portal and/or NSight database to a specified location and file. Select the database to backup
|--------------------------------------------------|--------------------------------------------------
| • captive-portal – Backs up captive portal database
| • nsight – Backs up NSight database
| After specifying the database type, configure the destination location and file name. |

| <URL> | Configures the destination location. The database is backed up at the specified location. Specify the location URL in one of the following formats: ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file.tar.gz
|--------------------------------------------------|--------------------------------------------------
| sftp://<user>:<passwd>@<hostname|IP>[:port]/path/file.tar.gz |

**Examples**

nx9500-6C8809#database-backup database nsight ftp://anonymous:anonymous@192.168.13.10/backups/nsight/nsight.tar.gz

**Related Commands**

<table>
<thead>
<tr>
<th>database</th>
<th>Enables automatic repairing (vacuuming) and dropping of databases (Captive-portal and NSight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>database-restore</td>
<td>Restores a previously exported (backed up) database [captive-portal and/or NSight]</td>
</tr>
</tbody>
</table>
3.1.18 database-restore

Privileged Exec Mode Commands

Restores a previously exported database [captive-portal and/or NSight]. Previously exported databases (backed up to a specified FTP or SFTP server) are restored from the backed-up location to the original database.

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax

database-restore database [captive-portal|nsight] <URL>

Parameters
- database-restore database [captive-portal|nsight] <URL>

| database-restore  | Restores previously exported (backed up) captive-portal and/or NSight database. Specify the database type:
| database          | • captive-portal – Restores captive portal database
| database          | • nsight – Restores NSight database
| <URL>             | After specifying the database type, configure the destination location and file name from where the files are restored.

<URL> Configures the destination location. The database is restored from the specified location. Specify the location URL in one of the following formats:
- ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file.tar.gz
- sftp://<user>:<passwd>@<hostname|IP>[:port]/path/file.tar.gz

Examples

nx9500-6C8809#database-restore database nsight
ftp://anonymous:anonymous@192.168.13.10/backups/nsight/nsight.tar.gz

Related Commands

| database         | Enables automatic repairing (vacuuming) and dropping of databases (Captive-portal and NSight)
| database-backup  | Backs up captive-portal and/or NSight database to a specified location and file on an FTP or SFTP server |
3.1.19 delete

Deletes a specified file from the device's file system

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
```
delete [/force <FILE>|/recursive <FILE>|<FILE>]
```

Parameters
- `/force <FILE>` Forces deletion without a prompt
- `/recursive <FILE>` Performs a recursive delete
- `<FILE>` Specifies the file name
  - Deletes the file specified by the `<FILE>` parameter

Examples
```
rfs7000-37FABE#delete flash:/out.tar flash:/out.tar.gz
Delete flash:/out.tar [y/n]? y
Delete flash:/out.tar.gz [y/n]? y

rfs7000-37FABE#delete /force flash:/tmp.txt
rfs7000-37FABE#
```
```
rfs7000-37FABE#delete /recursive flash:/backup/
Delete flash:/backup//fileMgmt_350_180B.core
[y/n]? y
Delete flash:/backup//fileMgmt_350_18212X.core_bk
[y/n]? n
Delete flash:/backup//imish_1087_18381X.core.gz
[y/n]? n
rfs7000-37FABE#
```
3.20 device-upgrade

Privileged Exec Mode Commands

Enables firmware upgrade on an adopted device or a set of adopted devices (access points, wireless controllers, and service platforms)

This command simplifies device upgradation within a hierarchically managed (HM) network. For more information on HM networks, see device-upgrade.

NOTE: A NOC controller’s capacity is equal to, or higher than that of a site controller. The following devices can be deployed at NOC and sites:

- NOC controller – RFS7000, NX9000, NX95XX (NX9500 and NX9510), NX9600
- Site controller – RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, or NX95XX

Within a HM network, the devices deployed as site controllers depends on the NOC controller device type. For more information on the adoption capabilities of various NOC controller devices, see Usage Guidelines (NOC controller adoption matrix).

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

device-upgrade <MAC/HOSTNAME> 
{force|no-reboot|reboot-time <TIME>|upgrade-time <TIME> {no-reboot|reboot-time <TIME>}}

device-upgrade all 
{force|no-reboot|reboot-time <TIME>|upgrade-time <TIME> {no-reboot|reboot-time <TIME>}} 
{(staggered-reboot)}

device-upgrade cancel-upgrade <MAC/HOSTNAME> 
{force|no-reboot|reboot-time <TIME>|upgrade-time <TIME> {no-reboot|reboot-time <TIME>}} 
{(staggered-reboot)}

device-upgrade load-image <MAC/HOSTNAME>
{<IMAGE-URL>|on <DEVICE-OR-DOMAIN-NAME>}

device-upgrade rf-domain <RF-DOMAIN-NAME>
{<MAC/HOSTNAME>|all}|containing <WORD>|filter location <WORD> 
{all|<MAC/HOSTNAME>|<DEVICE-OR-DOMAIN-NAME>}

device-upgrade rf-domain <RF-DOMAIN-NAME> 
{<MAC/HOSTNAME>|all|force|no-reboot|from-controller|reboot-time <TIME>|staggered-reboot|upgrade-time <TIME>}

NOTE: A NOC controller’s capacity is equal to, or higher than that of a site controller. The following devices can be deployed at NOC and sites:

- NOC controller – RFS7000, NX9000, NX95XX (NX9500 and NX9510), NX9600
- Site controller – RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, or NX95XX

Within a HM network, the devices deployed as site controllers depends on the NOC controller device type. For more information on the adoption capabilities of various NOC controller devices, see Usage Guidelines (NOC controller adoption matrix).
### Parameters

- **device-upgrade <MAC/HOSTNAME> {no-reboot|reboot-time <TIME>|upgrade-time <TIME> {no-reboot|reboot-time <TIME>}}**

<table>
<thead>
<tr>
<th>&lt;MAC/HOSTNAME&gt;</th>
<th>Upgrades firmware on the device identified by the &lt;MAC/HOSTNAME&gt; keyword</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;MAC/HOSTNAME&gt; – Specify the device’s MAC address or hostname.</td>
</tr>
<tr>
<td>no-reboot</td>
<td>Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)</td>
</tr>
<tr>
<td>reboot-time &lt;TIME&gt;</td>
<td>Optional. Schedules an automatic reboot after a successful upgrade</td>
</tr>
<tr>
<td></td>
<td>• &lt;TIME&gt; – Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format.</td>
</tr>
<tr>
<td>upgrade-time &lt;TIME&gt;</td>
<td>Optional. Schedules an automatic device firmware upgrade on a specified day and time</td>
</tr>
<tr>
<td></td>
<td>• &lt;TIME&gt; – Specify the upgrade time in the MM/DD/YYYY-HH:MM or HH:MM format. The following actions can be performed after a scheduled upgrade:</td>
</tr>
<tr>
<td></td>
<td>• no-reboot – Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)</td>
</tr>
<tr>
<td></td>
<td>• reboot-time &lt;TIME&gt; – Optional. Schedules an automatic reboot after a successful upgrade. Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format.</td>
</tr>
</tbody>
</table>

- **device-upgrade all {force|no-reboot|reboot-time <TIME>|upgrade-time <TIME> {no-reboot|reboot-time <TIME>}} {staggered-reboot}**

<table>
<thead>
<tr>
<th>all</th>
<th>Upgrades firmware on all devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>force</td>
<td>Optional. Select this option to force upgrade on the selected device(s). When selected, the devices are upgraded even if they have the same firmware as the upgrading access point, wireless controller, or service platform. If forcing a device upgrade, optionally specify any one of the following options: no-reboot, reboot-time, upgrade-time, or staggered-reboot.</td>
</tr>
<tr>
<td>no-reboot</td>
<td>Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)</td>
</tr>
<tr>
<td>reboot-time &lt;TIME&gt;</td>
<td>Optional. Schedules an automatic reboot after a successful upgrade</td>
</tr>
<tr>
<td></td>
<td>• &lt;TIME&gt; – Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format.</td>
</tr>
<tr>
<td>upgrade-time &lt;TIME&gt;</td>
<td>Optional. Schedules an automatic device firmware upgrade on all devices on a specified day and time</td>
</tr>
<tr>
<td></td>
<td>• &lt;TIME&gt; – Specify the upgrade time in the MM/DD/YYYY-HH:MM or HH:MM format. The following actions can be performed after a scheduled upgrade:</td>
</tr>
<tr>
<td></td>
<td>• no-reboot – Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)</td>
</tr>
<tr>
<td></td>
<td>• reboot-time &lt;TIME&gt; – Optional. Schedules an automatic reboot after a successful upgrade. Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format.</td>
</tr>
<tr>
<td>staggered-reboot</td>
<td>This keyword is recursive and common to all of the above.</td>
</tr>
<tr>
<td></td>
<td>• Optional. Enables staggered device reboot (one at a time), without network impact</td>
</tr>
</tbody>
</table>
device-upgrade <DEVICE-TYPE> all

Upgrades firmware on all devices of a specific type. Select the device type. The options are: AP621, AP622, AP650, AP6511, AP6522, AP6521, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX75XX, NX9000, NX9600, VX9000.

After selecting the device type, schedule an automatic upgrade and/or an automatic reboot.

force

Optional. Select this option to force upgrade on selected device(s). When selected, the devices are upgraded even if they have the same firmware as the upgrading access point, wireless controller, or service platform. If forcing a device upgrade, optionally specify any one of the following options: no-reboot, reboot-time, upgrade-time, or staggered-reboot.

no-reboot

Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)

reboot-time <TIME>

Optional. Schedules an automatic reboot after a successful upgrade

- <TIME> – Optional. Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format.

upgrade-time <TIME>

{no-reboot|reboot-time <TIME>}

Optional. Schedules an automatic firmware upgrade on all devices of the specified type, on a specified day and time

- <TIME> – Specify the upgrade time in the MM/DD/YYYY-HH:MM or HH:MM format.

upgrade-time <TIME>

{no-reboot|reboot-time <TIME>}

Optional. Schedules an automatic firmware upgrade on all devices of the specified type, on a specified day and time

- <TIME> – Specify the upgrade time in the MM/DD/YYYY-HH:MM or HH:MM format.

- no-reboot – Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)

- reboot-time <TIME> – Optional. Schedules an automatic reboot after a successful upgrade. Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format.

staggered-reboot

This keyword is recursive and common to all of the above.

- Optional. Enables staggered device reboot (one at a time), without network impact

cancel-upgrade

Cancels a scheduled firmware upgrade based on the parameters passed. This command provides the following options to cancel scheduled firmware upgrades:

- Cancels upgrade on specific device(s). The devices are identified by their MAC addresses or hostnames.
- Cancels upgrade on all devices within the network
- Cancels upgrade on all devices of a specific type. Specify the device type.
- Cancels upgrade on specific device or all device(s) within a specific RF Domain or all RF Domains. Specify the RF Domain name.

cancel-upgrade [MAC/HOSTNAME]|all

Cancels a scheduled firmware upgrade on a specified device or on all devices

- <MAC/HOSTNAME> – Cancels a scheduled upgrade on the device identified by the <MAC/HOSTNAME> keyword. Specify the device’s MAC address or hostname.
- all – Cancels scheduled upgrade on all devices
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cancel-upgrade &lt;DEVICE-TYPE&gt; all</td>
<td>Cancels scheduled firmware upgrade on all devices of a specific type. Select the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, VX9000.</td>
</tr>
<tr>
<td>cancel-upgrade on rf-domain [&lt;RF-DOMAIN-NAME&gt;]</td>
<td>Cancels scheduled firmware upgrade on all devices in a specified RF Domain or all RF Domains • &lt;RF-DOMAIN-NAME&gt; – Cancels scheduled device upgrade on all devices in a specified RF Domain. Specify the RF Domain name. • all – Cancels scheduled device upgrade on all devices across all RF Domains</td>
</tr>
<tr>
<td>load-image &lt;DEVICE-TYPE&gt;</td>
<td>Loads device firmware image from a specified location. Select the device type and provide the location of the required device firmware image. • &lt;DEVICE-TYPE&gt; – Specify the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, VX9000. After specifying the device type, provide the location of the required device firmware image.</td>
</tr>
<tr>
<td>&lt;IMAGE-URL&gt;</td>
<td>Specify the device’s firmware image location in one of the following formats: IPv4 URLs: tftp://&lt;hostname</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Specifies the name of a device or RF Domain. The image, of the specified device type is loaded from the device specified here. In case of an RF Domain, the image available on the RF Domain manager is loaded. • &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>
**device-upgrade** rf-domain [<RF-DOMAIN-NAME>|all|containing <WORD>|filter location <WORD>] [all|ap621|ap622|ap650|ap651|ap652|ap6522|ap6542|ap6552|ap6562|ap71xx|ap7502|ap7512|ap7522|ap7552|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45XX|nx5500|nx65XX|nx75xx|nx9000|nx9600|vx9000] {(<MAC/HOSTNAME>|force|from-controller|no-reboot|reboot-time <TIME>|staggered-reboot|upgrade-time <TIME>)}

| rf-domain [<RF-DOMAIN-NAME>|all|containing <WORD>|filter location <WORD>] | Upgrades firmware on devices in a specified RF Domain or all RF Domains. Devices within a RF Domain are upgraded through the RF Domain manager. |
|---|---|
| • <RF-DOMAIN-NAME> – Upgrades devices in the RF Domain identified by the <RF-DOMAIN-NAME> keyword. |
| • <RF-DOMAIN-NAME> – Specify the RF Domain name. |
| • all – Upgrades devices across all RF Domains |
| • containing <WORD> – Filters RF Domains by their names. RF Domains with names containing the sub-string identified by the <WORD> keyword are filtered. Devices on the filtered RF Domains are upgraded. |
| • filter location <WORD> – Filters devices by their location. All devices with location matching the <WORD> keyword are upgraded. |

<table>
<thead>
<tr>
<th>&lt;DEVICE-TYPE&gt;</th>
<th>After specifying the RF Domain, select the device type. The options are: AP621, AP622, AP650, AP651, AP652, AP6522, AP6542, AP6552, AP6562, AP71XX, AP7502, AP7512, AP7522, AP7552, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, VX9000.</th>
</tr>
</thead>
<tbody>
<tr>
<td>After specifying the RF Domain and the device type, configure any one of the following actions: force devices to upgrade, or initiate an upgrade through the adopting controller.</td>
<td></td>
</tr>
</tbody>
</table>

| <MAC/HOSTNAME> | Optional. Use this option to identify specific devices for upgradation. Specify the device’s MAC address or hostname. The device should be within the specified RF Domain and of the specified device type. After identifying the devices to upgrade, configure any one of the following actions: force devices to upgrade, or initiate an upgrade through the adopting controller. Note: If no MAC address or hostname is specified, all devices of the type selected are upgraded. |

| force | Optional. Select this option to force upgrade for the selected device(s). When selected, the devices are upgraded even if they have the same firmware as the upgrading access point, wireless controller, or service platform. If forcing a device upgrade, optionally specify any one of the following options: no-reboot, reboot-time, upgrade-time, or reboot-time. |

| from-controller | Optional. Upgrades a device through the adopted device. If initiating an upgrade through the adopting controller, optionally specify any one of the following options: no-reboot, reboot-time, upgrade-time, or reboot-time. |

| no-reboot (staggered-reboot) | Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted) |

| reboot-time <TIME> (staggered-reboot) | Optional. Schedules an automatic reboot after a successful upgrade. Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format. |

| staggered-reboot | This keyword is common to all of the above. Optional. Enables staggered reboot (one at a time), without network impact |
**Usage Guidelines (NOC controller adoption matrix)**

The following table displays NOC controllers and the corresponding site-level controllers supported by each:

<table>
<thead>
<tr>
<th>Site Controllers supported by each NOC controller</th>
<th>RFS7000</th>
<th>NX9000</th>
<th>NX95XX (NX9500 &amp; NX9510)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFS4000</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RFS6000</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RFS7000</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>NX45XX</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>NX65XX</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>NX7500</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>NX9000</td>
<td>-</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>NX95XX</td>
<td>-</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-6DCD4B#device-upgrade rfs6000-81742D
```

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4-C7-99-6D-CD-4B</td>
<td>Success</td>
<td>Queued 1 devices to upgrade</td>
</tr>
</tbody>
</table>

```
rfs7000-6DCD4B#
```

```
rfs7000-6DCD4B#show device-upgrade history
```

<table>
<thead>
<tr>
<th>Device</th>
<th>RESULT</th>
<th>TIME</th>
<th>RETRIES</th>
<th>UPGRADED-BY</th>
<th>LAST-UPDATE-ERROR</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs6000-81742D</td>
<td>done</td>
<td>2016-02-04 03:37:11</td>
<td>0</td>
<td>rfs7000-6DCD4B</td>
<td>-</td>
</tr>
<tr>
<td>rfs6000-81742D</td>
<td>done</td>
<td>2015-01-05 05:35:53</td>
<td>0</td>
<td>rfs7000-6DCD4B</td>
<td>-</td>
</tr>
<tr>
<td>rfs6000-81742D</td>
<td>failed</td>
<td>2014-09-28 23:25:45</td>
<td>3</td>
<td>rfs7000-6DCD4B</td>
<td>Reboot failed</td>
</tr>
<tr>
<td>rfs6000-81742D</td>
<td>done</td>
<td>2014-11-30 21:54:11</td>
<td>0</td>
<td>rfs7000-6DCD4B</td>
<td>-</td>
</tr>
<tr>
<td>rfs6000-81742D</td>
<td>done</td>
<td>2015-04-16 06:40:14</td>
<td>0</td>
<td>rfs7000-6DCD4B</td>
<td>-</td>
</tr>
</tbody>
</table>

```
--More--
rfs7000-6DCD4B#
```
rfs7000-6DCD4B#show device-upgrade versions

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>DEVICE-TYPE</th>
<th>VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs7000-6DCD4B</td>
<td>ap621</td>
<td>5.8.4.0-008D</td>
</tr>
<tr>
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<td>none</td>
</tr>
<tr>
<td>rfs7000-6DCD4B</td>
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</tr>
<tr>
<td>rfs7000-6DCD4B</td>
<td>rfs7000</td>
<td>none</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B#device-upgrade load-image rfs6000 ftp://anonymous:anonymous@192.168.13.10/LatestBuilds/W584/RFS6000-LEAN-5.8.4.0-008D.img

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Success</td>
<td>Successfully initiated load image</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B#show device-upgrade load-image-status
Download of rfs6000 firmware file is 50 percent complete

rfs7000-6DCD4B#device-upgrade load-image ap81xx ftp://anonymous:anonymous@192.168.13.10/LatestBuilds/W584/AP81XX-5.8.4.0-008D.img

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs7000-6DCD4B</td>
<td>Success</td>
<td>Successfully initiated load image</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B#show device-upgrade versions

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<th>VERSION</th>
</tr>
</thead>
<tbody>
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<td>5.8.4.0-008D</td>
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<td>none</td>
</tr>
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<td>------------------</td>
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<td>----------</td>
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</tr>
<tr>
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</tbody>
</table>

rfs7000-6DCD4B#


### 3.1.21 **diff**

> Privileged Exec Mode Commands

Displays the differences between two files on a device’s file system or a particular URL.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

diff [〈FILE〉|〈URL〉] [〈FILE〉|〈URL〉]

#### Parameters
- diff [〈FILE〉|〈URL〉] [〈FILE〉|〈URL〉]

| 〈FILE〉  | The first 〈FILE〉 is the source file for the diff command. The second 〈FILE〉 is used for comparison. |
| 〈URL〉   | The first 〈URL〉 is the source file's URL. The second 〈URL〉 is the second file's URL. |

#### Examples

rfs7000-6DCD4B#diff startup-config running-config
--- startup-config
+++ running-config
@@ -1,3 +1,4 @@
+!### show running-config
+
! Configuration of RFS7000 version 5.8.4.0-008D
+
@@ -550,7 +551,6 @@
use rf-domain default
hostname rfs7000-6DCD4B
license AP
4b80f4ee3ea6275cbd10fb2784037bca4369473741d8372962e4364f0c720059d1330b9348099b38
 - no adoption-site
  ip name-server 192.168.13.10
  ip default-gateway 192.168.13.2
  ip route 10.2.0.0/24 172.18.0.1
@@ -581,8 +581,6 @@
use profile default-rfs6000
use rf-domain default
hostname rfs6000-81742D
- model-number RFS-6010-1000-WR
- adoption-site B4-C7-99-6D-CD-4B
use radius-server-policy RADonbrd
interface vlan1
--More--

rfs7000-6DCD4B#
3.1.22  dir

Lists files on a device's file system

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dir {/all |/recursive |/DIR} |all-filesystems)

Parameters

- dir {/all |/recursive |/DIR} |all-filesystems)

|          | Optional. Lists all files
|----------|-------------------------|
| /all     | Optional. Lists files recursively
| /recursive | Optional. Lists files in the named file path
| <DIR>   | Optional. Lists files on all file systems

Examples

nx9500-6C8809# dir flash:/
Directory of flash:/
   -rw-   62937 Tue Nov 24 10:30:06 2015 run-config-backup.txt
drwx      Tue Jan 12 04:34:15 2016 crashinfo
drwx      Thu May 16 03:59:10 2013 upgrade
drwx      Mon Sep 28 04:18:33 2015 tmptpd
drwx      Wed Feb 3 02:57:10 2016 log
drwx      Tue Feb 2 05:06:55 2016 archived_logs
drwx      Thu May 16 03:59:10 2013 cache
drwx      Thu Feb 19 03:23:45 2015 floorplans
   -rw-  29708288 Wed Mar 18 01:02:13 2015 in.tar
drwx      Sun Sep 14 22:10:02 2014 hotspot

nx9500-6C8809#

nx9500-6C8809# dir all-filesystems
Directory of flash:/
   -rw-   62937 Tue Nov 24 10:30:06 2015 run-config-backup.txt
drwx      Tue Jan 12 04:34:15 2016 crashinfo
drwx      Thu May 16 03:59:10 2013 upgrade
drwx      Mon Sep 28 04:18:33 2015 tmptpd
drwx      Wed Feb 3 02:57:10 2016 log
drwx      Tue Feb 2 05:06:55 2016 archived_logs
drwx      Thu May 16 03:59:10 2013 cache
drwx      Thu Feb 19 03:23:45 2015 floorplans
   -rw-  29708288 Wed Mar 18 01:02:13 2015 in.tar
drwx      Sun Sep 14 22:10:02 2014 hotspot

Directory of nvram:

   lrwx    29 Tue Oct 27 10:52:21 2015 sensor_default_scan
   -rw-   42 Wed Dec 9 05:58:28 2015 mongod-config
   lrwx    28 Tue Oct 27 10:52:21 2015 sensor_custom_scan
   -rw-  31442 Tue Feb 2 05:06:50 2016 startup-config
   --More--
nx9500-6C8809#
3.1.23 disable

Privileged Exec Mode Commands

Turns off (disables) the privileged mode command set. This command returns to the User Executable mode.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

disable

Parameters

None

Examples

rfs7000-37FABE#disable
rfs7000-37FABE>
3.1.24 edit

Privileged Exec Mode Commands

Edits a text file on the device’s file system

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
edit <FILE>

Parameters
- edit <FILE>

| <FILE> | Specify the name of the file to modify. |

Examples
rfs4000-229D58#edit startup-config
  GNU nano 1.2.4                File: startup-config
  ! Configuration of RFS4000 version 5.8.4.0-008D
  !
  ! version 2.5
  !
  firewall-policy default
  no ip dos tcp-sequence-past-window
  alg sip
  !
  mint-policy global-default
  router packet priority 6
  !
  radio-qos-policy default
  !
  management-policy default
  [ Read 252 lines ]

^G Get Help  ^O WriteOut  ^R Read File  ^Y Prev Page  ^K Cut Text  ^C Cur Pos
^X Exit  ^J Justify  ^W Where Is  ^V Next Page  ^U UnCut Txt  ^T To Spell
3.1.25 enable

Privileged Exec Mode Commands

Turns on (enables) the privileged mode command set. This command does not do anything in the Privilege Executable mode.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

enable

Parameters

None

Examples

rfs7000-37FABE#enable
rfs7000-37FABE#
### 3.1.26 erase

**Privileged Exec Mode Commands**

Erases a device’s (wireless controller, access point, and service platform) file system. Erases the content of the specified storage device. Also erases the startup configuration to restore the device to its default.

Supported in the following platforms:
- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```plaintext
erase [flash:|nvram:|startup-config|usb1:|usb2:|usb3:|usb4:]
 erase [flash:|nvram:|usb1:|usb2:|usb3:|usb4:]
erase startup-config {<HOSTNAME/MAC>|on <DOMAIN-NAME> {containing <SUB-STRING>|
   exclude-controllers|exclude-rf-domain-manager|filter <DEVICE-TYPE>}}
```

#### Parameters

  - **flash:** Erases everything in the device’s flash: file
  - **nvram:** Erases everything in the device’s nvram: file
  - **startup-config:** Erases the device’s startup configuration file. The startup configuration file is used to configure the device when it reboots.
  - **usb1:** Erases everything in the device’s usb1: file
    **Note:** The number of USB ports displayed varies for different device types. For example, an NX95XX has two USB ports, while an NX45XX has four USB ports.
  - **usb2:** Erases everything in the device’s usb2: file
  - **usb3:** Erases everything in the device’s usb3: file
  - **usb4:** Erases everything in the device’s usb4: file

- `erase startup-config {<HOSTNAME/MAC>|on <DOMAIN-NAME> {containing <SUB-STRING>|
  exclude-controllers|exclude-rf-domain-manager|filter <DEVICE-TYPE>}}`

  - **startup-config:** Erases the startup configuration file on a specified device or devices in a specified RF Domain. The specified device(s) are reloaded after the startup configuration file is erased. Use the `<HOSTNAME/MAC>` or `on <DOMAIN-NAME>` options to identify the device or RF Domain respectively. Once executed, the configuration file, for the targeted device or for all device(s) in the targeted RF Domain, is also erased from the adopting controller’s configuration file. The are automatically reloaded once the startup configuration file has been erased.

- `<HOSTNAME/MAC>` Optional. Erases the startup configuration file on the device identified by the `<HOSTNAME/MAC>` keyword. Specify the device’s hostname or MAC address.
on <DOMAIN-NAME>
{containing <SUB-STRING>|
exclude-controllers|
exclude-rf-domain-manager|
filter <DEVICE-TYPE>}

Optional. Erases the startup configuration file on all devices or specified device(s) in a specified RF Domain

- <DOMAIN-NAME> – Specify the RF Domain name. After specifying the RF Domain, optionally use the filters provided to identify specific device(s) within the RF Domain.
  If none of the filters are used, the command is executed on all devices within the RF Domain. These filters are:
  - containing <SUB-STRING> – Optional. Executes the command on all devices containing a specified sub-string in their hostname
  - <SUB-STRING> – Specify the sub-string to match. The startup configuration file is erased on all devices whose hostname contains the sub-string specified here.
  - exclude-controllers – Optional. Executes the command on all devices excluding controllers. The startup configuration file is erased on all devices except controllers.
  - exclude-rf-domain-manager – Optional. Executes the command on all devices excluding RF Domain managers. The startup configuration file is erased on all devices except RF Domain managers.
  - filter <DEVICE-TYPE> – Optional. Executes the command on all devices of a specified type
    - <DEVICE-TYPE> – Specify the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, VX9000. The startup configuration file is erased on all devices of the type specified here. For example, if AP6521 is the device-type specified, the startup configuration file on all AP6521s, within the RF Domain, is erased.

Examples

nx4500-5CFA2B#erase ?
 flash:       Erase everything in flash:
 nvram:      Erase everything in nvram:
 startup-config   Reset configuration to factory default
 usb1:       Erase everything in usb1:
 usb2:       Erase everything in usb2:
 usb3:       Erase everything in usb3:
 usb4:       Erase everything in usb4:

nx4500-5CFA2B#

The following example shows the startup configuration file being erased on a device having hostname 'rfs6000-81701D':

rfs7000-6DCD4B#erase startup-config rfs6000-81701D

```
+---------------------------------+-----------------+------------------+
| DEVICE | STATUS   | MESSAGE          |
+---------------------------------+-----------------+------------------+
| 00-15-70-81-70-1D               | Success         | None             |
+---------------------------------+-----------------+------------------+
```
rfs7000-6DCD4B#
3.1.27 ex3500

Privileged Exec Mode Commands

Enables EX3500 switch firmware management. Use this command to perform the following operations: boot, copy, delete, and IP-related configurations.

The copy keyword provides multiple copy options. It allows you to upload or download code images or configuration files between the switch’s flash memory and an FTP/TFTP server. When you save the system code or configuration settings to a file on an FTP/TFTP server, that file can later be downloaded to the switch to restore system operation. The success of the file transfer depends on the accessibility of the FTP/TFTP server and the quality of the network connection.

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax

```
ex3500 [adopted|boot|copy|delete|ip]
ex3500 adopted upgrade <URL> on <EX3500-DEVICE-NAME>
ex3500 boot system <1-1> (config|opcode) <FILE-NAME> on <EX3500-DEVICE-NAME>
ex3500 copy [file|ftp|running-config|tftp|unit] [add-to-running-config|file|https-certificate|public-key]
ex3500 copy [ftp|tftp] [running-config|startup-config] <FTP/TFTP-SERVER-IP> <USER-NAME> <PASSWORD> <SOURCE-CONFIG-FILE-NAME> on <EX3500-DEVICE-NAME>
ex3500 copy unit file <1-1> [1|2] <SOURCE-FILE-NAME> <DEST-FILE-NAME> on <EX3500-DEVICE-NAME>
ex3500 delete [file|public-key]
ex3500 delete file [name <FILE-NAME>|unit <1-1> name <FILE-NAME>] on <EX3500-DEVICE-NAME>
ex3500 delete public-key <USER-NAME> [dsa|rsa] on <EX3500-DEVICE-NAME>
ex3500 ip ssh [crypto|save]
ex3500 ip ssh crypto host-key generates [dsa|rsa] on <EX3500-DEVICE-NAME>
```
ex3500 ip ssh crypto zeroize [dsa|rsa] on <EX3500-DEVICE-NAME>
ex3500 ip ssh save host-key on <EX3500-DEVICE-NAME>

**Parameters**

- **ex3500 adopted upgrade <URL> on <EX3500-DEVICE-NAME>**

  *Upgrades an adopted EX3500 switch*

  **Note:** After an upgrade, reboot the EX3500 switch to initiate the new image. To view an EX3500's current image version, use the `show > version > on <EX3500-DEVICE-NAME>` command.

  <URL> Specifies the location and image file name in the following format: `tftp://<IP>/[/path]/file`

  **on <EX3500-DEVICE-NAME>**

  Executes the command on a specified EX3500 switch

  - `<EX3500-DEVICE-NAME>` – Specify the EX3500 switch's hostname.

- **ex3500 boot system <1-1> (config|opcode) <FILE-NAME> on <EX3500-DEVICE-NAME>**

  *Boots a EX3500 switch using a specified configuration file*

  `<1-1>` Identifies the EX3500 unit by its ID number. Specify the EX3500 ID from 1 - 1.

  **Note:** As of now only one (1) EX3500 unit can be managed through a NOC controller.

  (config|opcode) `<FILE-NAME>`

  The following keywords are recursive:

  Specifies the image file to use for booting. The options are:

  - config – Uses the configuration file to boot the switch
  - opcode – Uses the Operation Code (opcode), which is the runtime code, to boot the switch. The opcode is like an operating system that enables the WiNG software to communicate with the EX3500 device.

  The following parameter is common to the 'config' and 'opcode' keywords:

  - `<FILE-NAME>` – Specify the configuration/runtime-code file name.

  **on <EX3500-DEVICE-NAME>**

  Reloads a specified EX3500 switch

  - `<EX3500-DEVICE-NAME>` – Specify the EX3500 switch's hostname. You can also specify its MAC address.

- **ex3500 copy file file <SOURCE-FILE-NAME> <DEST-FILE-NAME> on <EX3500-DEVICE-NAME>**

  *Copies a configuration file to another file*

  file file `<SOURCE-FILE-NAME>` `<DEST-FILE-NAME>`

  Copies a specified file (this is the source configuration file)

  - file – Copies the specified source file to a specified file (this is the destination configuration file)
  - `<SOURCE-FILE-NAME>` – Specify the source configuration file’s name
  - `<DEST-FILE-NAME>` – Specify the destination configuration file’s name

  When specifying the destination file name, keep in mind the following points:

  - It should not contain slashes (`/` or `/`),
  - It should not exceed 32 characters for files on the switch, or 127 characters for files on the server.

  **on <EX3500-DEVICE-NAME>**

  Copies the file to a specified EX3500 switch

  - `<EX3500-DEVICE-NAME>` – Specify the EX3500 switch’s hostname. The specified source file is copied to specified destination file on the EX3500 identified here.
### PRIVILEGED EXEC MODE COMMANDS

**ex3500 copy [ftp|tftp] add-to-running-config**

Copies files from a FTP or TFTP server. This command allows you to copy the following types of files: HTTPS certificate, running configuration, startup configuration, public key, etc.

This command also allows you to add a remote system’s running configuration to the current system configuration.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>add-to-running-config</td>
<td>Adds a remote system’s running configuration to the current system</td>
</tr>
<tr>
<td><strong>&lt;FTP/TFTP-SERVER-IP&gt;</strong></td>
<td>Configures the FTP or TFTP server details (depending on the option selected in the previous step), such as IP address and user credentials. This is the device running the FTP/TFTP server.</td>
</tr>
<tr>
<td><strong>&lt;USER-NAME&gt;</strong></td>
<td>If using a FTP server, specify the FTP server’s user name (should be an authorized user)</td>
</tr>
<tr>
<td><strong>&lt;PASSWORD&gt;</strong></td>
<td>Specify the password applicable for the above specified FTP server user name.</td>
</tr>
<tr>
<td><strong>&lt;SOURCE-FILE-NAME&gt;</strong></td>
<td>After specifying the server details, specify the name of the running configuration file.</td>
</tr>
<tr>
<td>on <strong>&lt;EX3500-DEVICE-NAME&gt;</strong></td>
<td>Copies the file to a specified EX3500 switch</td>
</tr>
</tbody>
</table>

**ex3500 copy [ftp|tftp] file**

Copies files from a FTP or TFTP server. This command allows you to copy the following types of files: HTTPS certificate, running configuration, startup configuration, public key, etc.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>file</td>
<td>Copies to a specified file system</td>
</tr>
<tr>
<td><strong>&lt;FTP/TFTP-SERVER-IP&gt;</strong></td>
<td>Configures the FTP or TFTP server details (depending on the option selected in the previous step), such as IP address and user credentials. This is the device running the FTP/TFTP server.</td>
</tr>
<tr>
<td><strong>&lt;USER-NAME&gt;</strong></td>
<td>If using a FTP server, specify the FTP server’s user name (should be an authorized user)</td>
</tr>
<tr>
<td><strong>&lt;PASSWORD&gt;</strong></td>
<td>Specify the password applicable for the above specified FTP server user name.</td>
</tr>
<tr>
<td>**[1</td>
<td>2]**</td>
</tr>
<tr>
<td><strong>&lt;SOURCE-FILE-NAME&gt;</strong></td>
<td>After specifying the server details, select the file type and specify the name of the source and destination file names.</td>
</tr>
<tr>
<td><strong>&lt;DEST-FILE-NAME&gt;</strong></td>
<td>Specifies the source file’s name.</td>
</tr>
<tr>
<td>on <strong>&lt;EX3500-DEVICE-NAME&gt;</strong></td>
<td>Specifies the EX3500 switch’s hostname. The specified source file is copied to specified destination file on the EX3500 identified here.</td>
</tr>
</tbody>
</table>
### ex3500 copy [ftp|tftp] https-certificate

Copies HTTPS secure site certificate from the FTP or TFTP server to the switch.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

### ex3500 copy [ftp|tftp] public-key

Copies the SSH public key from the FTP or TFTP server to the switch.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

### ex3500 copy [ftp|tftp]

Copies files from a FTP or TFTP server. This command allows you to copy the following types of files: HTTPS certificate, running configuration, startup configuration, public key, etc.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

### ex3500 copy [ftp|tftp]

Copies the file to a specified EX3500 device.

```
on <EX3500-DEVICE-NAME>
```

- **<EX3500-DEVICE-NAME>** – Specify the EX3500 device’s hostname. The specified source file is copied to specified destination file on the EX3500 identified here.

---

### https-certificate

Copies HTTPS secure site certificate from the FTP or TFTP server to the switch.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

### public-key

Copies the SSH public key from the FTP or TFTP server to the switch.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

---

### ex3500 copy [ftp|tftp]

Copies files from a FTP or TFTP server. This command allows you to copy the following types of files: HTTPS certificate, running configuration, startup configuration, public key, etc.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

---

### https-certificate

Copies HTTPS secure site certificate from the FTP or TFTP server to the switch.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

---

### public-key

Copies the SSH public key from the FTP or TFTP server to the switch.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

---

### ex3500 copy [ftp|tftp]

Copies files from a FTP or TFTP server. This command allows you to copy the following types of files: HTTPS certificate, running configuration, startup configuration, public key, etc.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

---

### https-certificate

Copies HTTPS secure site certificate from the FTP or TFTP server to the switch.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

---

### public-key

Copies the SSH public key from the FTP or TFTP server to the switch.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.

---

### ex3500 copy [ftp|tftp]

Copies files from a FTP or TFTP server. This command allows you to copy the following types of files: HTTPS certificate, running configuration, startup configuration, public key, etc.

```
```

- **<FTP/TFTP-SERVER-IP>** – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- **<USER-NAME>** – If using a FTP server, specify the FTP server’s user name (should be an authorized user).
- **<PASSWORD>** – Specify the password applicable for the above specified FTP server user name.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>**ex3500 copy [ftp</td>
<td>tftp] [running-config</td>
</tr>
<tr>
<td>**ex3500 copy unit file &lt;1-1&gt; [1</td>
<td>2] &lt;SOURCE-FILE-NAME&gt; &lt;DEST-FILE-NAME&gt; on &lt;EX3500-DEVICE-NAME&gt;**</td>
</tr>
<tr>
<td><strong>&lt;SOURCE-FILE-NAME&gt;</strong></td>
<td>Configures the source file name. You can copy the running configuration file to the startup configuration file and vice versa.</td>
</tr>
</tbody>
</table>

After identifying the FTP or TFTP server, specify the following:
- [1|2] – Configures the SSH public key type as RS or DSA
  - 1 – Configures the public key type as RSA
  - 2 – Configures the public key type as DSA
- <SOURCE-PUB-KEY-FILE-NAME> – Specifies the source public key file name
- <USER-NAME> – Specifies the public key’s user name.

Copies the public key to a specified EX3500 device
- <EX3500-DEVICE-NAME> – Specify the EX3500 device’s hostname.

Copies files from a FTP or TFTP server.
- <FTP/TFTP-SERVER-IP> – Specify the FTP or TFTP server’s IP address in the A.B.C.D format.
- <USER-NAME> – If using a FTP server, specify the FTP server’s user name (should be an authorized user)
- <PASSWORD> – Specify the password applicable for the above specified FTP server user name.

Copies the running or startup configuration file to one of the following destinations: file system, FTP server, or TFTP server
- <DEST-FILE-NAME> – Specify the destination file name. You can also copy the running configuration file to the startup configuration file and vice versa.

Copies the running or startup configuration file on to a specified EX3500 device
- <EX3500-DEVICE-NAME> – Specify the EX3500 device’s hostname.

Copies the file system from the EX3500 switch identified by the unit number
- <1-1> – Specify the unit number from 1 - 1.
  - [1|2] – Select the file type from 1 - 2.
  - 1 – Copies the selected unit’s configuration file.
  - 2 – Copies the selected unit’s opcode, which is the runtime code. The opcode is like an operating system that enables the WiNG software to communicate with the EX3500 device.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ex3500 delete file</strong></td>
<td>Deletes a file or image on a specified EX3500 device</td>
</tr>
<tr>
<td><code>&lt;DEST-FILE-NAME&gt;</code></td>
<td>Configures the destination file name. The running or startup configuration file is copied to the specified file.</td>
</tr>
<tr>
<td><code>&lt;EX3500-DEVICE-NAME&gt;</code></td>
<td>Copies the running or startup configuration file on to a specified EX3500 device</td>
</tr>
<tr>
<td><code>name &lt;FILE-NAME&gt;</code></td>
<td>Specifies the file to delete. The specified file is deleted.</td>
</tr>
<tr>
<td><code>&lt;EX3500-DEVICE-NAME&gt;</code></td>
<td>Identifies the unit in the stackable system on which the file is located</td>
</tr>
<tr>
<td><code>&lt;FILE-NAME&gt;</code></td>
<td>Specifies the file name.</td>
</tr>
<tr>
<td><code>&lt;EX3500-DEVICE-NAME&gt;</code></td>
<td>Specifies the EX3500 device's hostname.</td>
</tr>
<tr>
<td><strong>ex3500 delete public-key</strong></td>
<td>Deletes a specified user's public key</td>
</tr>
<tr>
<td><code>&lt;USER-NAME&gt;</code></td>
<td><code>dsa</code> or <code>rsa</code></td>
</tr>
<tr>
<td><code>&lt;EX3500-DEVICE-NAME&gt;</code></td>
<td>Specifies the SSH user's name.</td>
</tr>
<tr>
<td><code>&lt;FILE-NAME&gt;</code></td>
<td>Deletes the specified user's DSA (version 2) key.</td>
</tr>
<tr>
<td><code>&lt;EX3500-DEVICE-NAME&gt;</code></td>
<td>Deletes the specified user's RSA (version 1) key.</td>
</tr>
<tr>
<td><strong>ex3500 ip ssh crypto host-key generates</strong></td>
<td>Generates the host-key pair (public and private). This host key is used by the SSH server to negotiate a session key and encryption method with the client trying to connect to it.</td>
</tr>
<tr>
<td><code>&lt;EX3500-DEVICE-NAME&gt;</code></td>
<td><code>dsa</code> or <code>rsa</code></td>
</tr>
<tr>
<td><code>&lt;USER-NAME&gt;</code></td>
<td>Generates DSA (version 2) key type.</td>
</tr>
<tr>
<td><code>&lt;FILE-NAME&gt;</code></td>
<td>Generates RSA (version 1) key type.</td>
</tr>
<tr>
<td><strong>ex3500 ip ssh zeroize</strong></td>
<td>Removes the host-key (DSA and RSA) from the volatile memory (i.e. RAM)</td>
</tr>
<tr>
<td><code>&lt;EX3500-DEVICE-NAME&gt;</code></td>
<td><code>&lt;USER-NAME&gt;</code></td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><code>ex3500 ip ssh save host-key on &lt;EX3500-DEVICE-NAME&gt;</code></td>
<td>Saves the host-key (DSA and RSA) to the flash memory on a specified EX3500 device.</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

When using the `ex3500` command and its parameters, keep in mind the following:

- Destination file names should not:
  - Contain slashes (\ or /),
  - Exceed 32 characters for files on the switch, or 127 characters for files on the server.
- The FTP server’s default user name is set as “anonymous”.
- The Boot ROM and Loader cannot be uploaded or downloaded from the FTP/TFTP server. Follow instructions provided in the release notes for new firmware, or contact your distributor for help.
- The “Factory_Default_Config.cfg” can be used as the source to copy from, but cannot be used as the destination.
- Although the switch supports only two operation code files, the maximum number of user-defined configuration files supported is 16.

**Examples**

```plaintext
nx9500-6C8809#adopted upgrade tftp://192.168.0.99/ex3500-adopted-5.8.4.0.img on ex3524-ED5EAC
Flash programming started
Flash programming completed
Successful
nx9500-6C8809#

nx9500-6C8809#ex3500 copy tftp file 10.2.0.100 1 m360.bix m360.bix on ex3524-ED5EAC
  \Write to FLASH Programming.
  \Write to FLASH finish.
  \Success.
  nx9500-6C8809#

nx9500-6C8809#ex3500 copy tftp startup-config 10.2.0.99 startup.01 startup on ex3524-ED5EAC
TFTP server ip address: 10.1.0.99
Flash programming started.
Flash programming completed.
Success.
nx9500-6C8809#
```
3.1.28 factory-reset

Privileged Exec Mode Commands

Erases startup configuration on a specified device or all devices within a specified RF Domain

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

factory-reset [<HOSTNAME/MAC>|config-all|config-device-only|on <RF-DOMAIN-NAME>]

factory-reset <HOSTNAME/MAC> {<HOSTNAME/MAC>}

factory-reset on <RF-DOMAIN-NAME> {containing <SUB-STRING>|exclude-controllers|exclude-rf-domain-manager|filter <DEVICE-TYPE>}

factory-reset [config-all|config-device-only] [<HOSTNAME/MAC> {<HOSTNAME/MAC>}] on <RF-DOMAIN-NAME> {containing <SUB-STRING>|exclude-controllers|exclude-rf-domain-manager|filter <DEVICE-TYPE>}

Parameters

- factory-reset <HOSTNAME/MAC> {<HOSTNAME/MAC>}

<table>
<thead>
<tr>
<th>factory-reset</th>
<th>Erases startup configuration and reloads device(s) based on the parameters passed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;HOSTNAME/MAC&gt;</td>
<td>Erases startup configuration and reloads the device identified by the &lt;HOSTNAME/MAC&gt; keyword. Specify the device’s hostname or MAC address.</td>
</tr>
<tr>
<td>{&lt;HOSTNAME/MAC&gt;}</td>
<td></td>
</tr>
<tr>
<td>• &lt;HOSTNAME/MAC&gt; – Optional. You can optionally specify multiple space-separated devices.</td>
<td></td>
</tr>
</tbody>
</table>
| • factory-reset on <RF-DOMAIN-NAME> {containing <SUB-STRING>|exclude-controllers|exclude-rf-domain-manager|filter <DEVICE-TYPE>}

<table>
<thead>
<tr>
<th>factory-reset</th>
<th>Erases startup configuration and reloads device(s) based on the parameters passed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;RF-DOMAIN-NAME&gt; {containing &lt;SUB-STRING&gt;</td>
<td>exclude-controllers</td>
</tr>
<tr>
<td>• &lt;RF-DOMAIN-NAME&gt; – Specify the RF Domain name. After specifying the RF Domain, optionally use the filters provided to identify specific device(s) within the RF Domain. If none of the filters are used, the command is executed on all devices within the RF Domain. These filters are:</td>
<td></td>
</tr>
<tr>
<td>• containing &lt;SUB-STRING&gt; – Optional. Executes the command on all devices containing a specified sub-string in their hostname.</td>
<td></td>
</tr>
<tr>
<td>• &lt;SUB-STRING&gt; – Specify the sub-string to match.</td>
<td></td>
</tr>
<tr>
<td>• exclude-controllers – Optional. Executes the command on all devices excluding controllers. Since only a NOC controller is capable of adopting other controllers, use this option when executing the command on a NOC controller.</td>
<td></td>
</tr>
</tbody>
</table>

Contd..
### factory-reset

- **exclude-rf-domain-manager** – Optional. Executes the command on all devices excluding RF Domain managers. Use this option when executing the command on the NOC, site controller, or RF Domain manager.
- **filter <DEVICE-TYPE>** – Optional. Executes the command on all devices of a specified type
  - <DEVICE-TYPE> – Specify the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, V4X9000. The startup configuration is erased on all devices of the type specified here. For example, if AP6521 is the device-type specified, the command is executed on all AP6521s within the specified RF Domain.

- **<HOSTNAME/MAC>** – Erases startup configuration and reloads the device identified by the <HOSTNAME/MAC> keyword. Specify the device's hostname or MAC address.
  - <HOSTNAME/MAC> – Optional. You can optionally specify multiple space-separated devices.

- **on <RF-DOMAIN-NAME> {containing <SUB-STRING>|exclude-controllers|exclude-rf-domain-manager|filter <DEVICE-TYPE>}]**

- **factory-reset **Erases startup configuration and reloads device(s) based on the parameters passed

  For more information on the actions performed by this command, see Actions performed by the factory-reset command.

- **[config-all] config-device-only**

  Erases startup configuration and reloads only controller-adopted devices or the controller as well as its adopted devices
  - config-all – Erases startup configuration on the controller and all devices adopted by it
  - config-device-only – Erases startup configuration only on the devices adopted by the controller

- **<HOSTNAME/MAC> {<HOSTNAME/MAC>}**

  This parameter is common to the ‘config-all’ and ‘config-device-only’ keywords:
  - <HOSTNAME/MAC> – Erases startup configuration and reloads the device identified by the <HOSTNAME/MAC> keyword. Specify the device’s hostname or MAC address.
  - <HOSTNAME/MAC> – Optional. You can optionally specify multiple space-separated devices.

- **on <RF-DOMAIN-NAME> {containing <SUB-STRING>|exclude-controllers|exclude-rf-domain-manager|filter <DEVICE-TYPE>}]**

  The following parameters are common to the ‘config-all’ and ‘config-device-only’ keywords:
  - on <RF-DOMAIN-NAME> – Erases startup configuration and reloads all devices or specified device(s) within a specified RF Domain
  - <RF-DOMAIN-NAME> – Specify the RF Domain name. After specifying the RF Domain, optionally use the filters provided to identify specific device(s) within the RF Domain. If none of the filters are used, the command is executed on all devices within the RF Domain. These filters are:
    - containing <SUB-STRING> – Optional. Executes the command on all devices containing a specified sub-string in their hostname
    - <SUB-STRING> – Specify the sub-string to match.
    - exclude-controllers – Optional. Executes the command on all devices excluding controllers. Since only a NOC controller is capable of adopting other controllers, use this option when executing the command on a NOC controller.
    - exclude-rf-domain-manager – Optional. Executes the command on all devices excluding RF Domain managers. Use this option when executing the command on the NOC, Site controller, or RF Domain manager.

Contd..
Usage Guidelines Actions performed by the factory-reset command.
The action taken by this command depends on the parameters passed.

- For the `factory-reset [<DEVICE-NAME>|on <RF-DOMAIN-NAME>]` options, the command:
  - Erases startup configuration on the target device (or) all devices in the target RF Domain.
  - Erases the device configuration entries from the controller’s configuration for the target device (or) for all the devices in the target RF Domain.
  - Reloads the target device (or) all devices in the target RF Domain.

- For the `factory-reset config-all [<DEVICE-NAME>|on <RF-DOMAIN-NAME>]` options, the command:
  - Erases startup configuration on the target device (or) all devices in the target RF Domain.
  - Erases the device configuration entries from the controller’s configuration for the target device (or) for all the devices in the target RF Domain.

- For the `factory-reset config-device-only [<DEVICE-NAME>|on <RF-DOMAIN-NAME>]` options, the command:
  - Erases startup configuration on the target device (or) all devices in the target RF Domain.

Examples

nx7500-7F3609# factory-reset config-all ap6522-5A873C
In progress ....
Erased startup-config - success 1 fail 0
Successful device deletion - total 1
nx7500-7F3609#

rfs6000-18072B# factory-reset ap650-72DBC4 ap650-72E53C
In progress ....
Erased startup-config and initiated reload - success 2 fail 0
Successful device deletion - total 2
rfs6000-18072B#

rfs6000-18072B# factory-reset B4-C7-99-5A-87-3C
In progress ....
Erased startup-config and initiated reload - success 1 fail 0
Successful device deletion - total 1
rfs6000-18072B#

The following example displays the access points in the RF Domain ‘rfd1’:

nx7500-7F3609# show wireless ap on rfd1

```
-------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>AP-NAME</th>
<th>AP-LOCATION</th>
<th>RF-DOMAIN</th>
<th>AP-MAC</th>
<th>#RADIOS</th>
<th>MODE</th>
<th>#CLIENT</th>
<th>IPv4</th>
<th>IPv6</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap7131-1180FC</td>
<td>rfd1</td>
<td></td>
<td>00-23-68-11-80-FC</td>
<td>2</td>
<td>W-W</td>
<td>0</td>
<td>0.0.0.0</td>
<td>::</td>
</tr>
<tr>
<td>ap6522-551648</td>
<td>rfd1</td>
<td></td>
<td>B4-C7-99-55-16-48</td>
<td>2</td>
<td>W-W</td>
<td>0</td>
<td>0.0.0.0</td>
<td>::</td>
</tr>
<tr>
<td>ap8232-7F0DF8</td>
<td>rfd1</td>
<td></td>
<td>FC-0A-81-7F-0D-F8</td>
<td>2</td>
<td>W-W</td>
<td>0</td>
<td>0.0.0.0</td>
<td>::</td>
</tr>
</tbody>
</table>
-------------------------------------------------------------------------------
Total number of APs displayed: 3
```

nx7500-7F3609#
When the factory-reset command is executed on the RF Domain 'rfd1' with 'exclude-rf-domain-manager' the startup configuration:

- is erased on all non-domain-manager devices (ap7131-1180FC and ap6522-551648) within the RF Domain 'rfd1', but
- not erased on the RF Domain manager (ap8232-7F0DF8).

nx7500-7F3609# factory-reset config-device-only on rfd1 exclude-rf-domain-manager

In progress ....
Erased startup-config -
ap7131-1180FC: OK
ap6522-551648: OK

nx7500-7F3609#

nx7500-7F3609# factory-reset on rfd2
In progress ....
Erased startup-config and initiated reload -
ap650-A6566C: OK, Reload scheduled in 60 seconds...
ap4532-34505C: OK, Reload scheduled in 60 seconds...
ap650-345000: OK, Reload scheduled in 60 seconds...

Successful device deletion - total 3
nx7500-7F3609#
## 3.1.29 file-sync

### Privileged Exec Mode Commands

Syncs EAP-TLS X.509 (PKCS#12) certificate between the staging-controller and adoptee AP6522/AP6562 client-bridge access points. Use this command to configure parameters that enable syncing of PKCS#12 certificate.

When enabling file syncing, consider the following points:

- The X.509 certificate needs synchronization only if the access point’s radio2, the client-bridge radio, is configured to use EAP-TLS authentication
- Execute the command on the controller adopting the access point
- Ensure that the X.509 certificate file is installed on the controller
- If the adopting device is a site controller with layer 3 adoption to the NOC, ensure that the X.509 certificate is synced across the hierarchically managed setup – between the NOC, site-controller (the staging-controller), and the client-bridge access points.

Syncing of wireless client-bridge certificate can be automated. To automate the file syncing process, in the controller’s device/profile configuration mode, execute the following command: `file-sync [auto]count <1-20>`. For more information, see `file-sync`.

For more information on configuring an AP client-bridge, see `bridge`.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

```
file-sync [cancel|load-file|wireless-bridge]

file-sync cancel wireless-bridge [DEVICE-NAME]|all|rf-domain [DOMAIN-NAME]|all]

file-sync load-file wireless-bridge <URL>

file-sync wireless-bridge [DEVICE-NAME]|all|rf-domain [DOMAIN-NAME]|all] {from-controller} {reset-radio|upload-time <TIME>}
```

### Parameters

- `file-sync cancel wireless-bridge [DEVICE-NAME]|all|rf-domain [DOMAIN-NAME]|all]`

  Cancels scheduled wireless client-bridge certificate synchronization on a specified AP, or all APs, or APs within an RF Domain
  - `DEVICE-NAME` – Cancels scheduled certificate synchronization on the AP identified by the `DEVICE-NAME` parameter. Specify the AP’s hostname or MAC address.
  - all – Cancels scheduled certificate synchronization on all APs
  - `rf-domain [DEVICE-NAME]|all` – Cancels scheduled certificate synchronization on all APs in a specified RF Domain or in all RF Domains
  - `DOMAIN-NAME` – Cancels scheduled certificate synchronization on all APs within the RF Domain identified by the `DOMAIN-NAME` parameter. Specify the RF Domain’s name.
  - all – Cancels scheduled certificate synchronization on all RF Domains
• `file-sync load-file wireless-bridge <URL>`

  **file-sync load-file wireless-bridge <URL>**

  Loads the wireless client-bridge certificate to the staging controller. Use this command to load the certificate to the controller before scheduling or initiating a certificate synchronization.

  - `<URL>` – Provide the certificate location using one of the following formats:
    - tftp://<hostname|IP>[<port>/]path/file
    - ftp://<user>:<passwd>@<hostname|IP>[<port>/]path/file
    - sftp://<user>:<passwd>@<hostname|IP>[<port>/]path/file
    - http://<hostname|IP>[<port>/]path/file
    - cf:/path/file
    - usb<n>:/path/file

  **Note:** Both IPv4 and IPv6 address types are supported.

• `file-sync wireless-bridge [DEVICE-NAME]|all|rf-domain [DOMAIN-NAME]|all] from-controller] {reset-radio|upload-time <TIME>}`


  Configures the following file-sync parameters:
  - post certificate synchronization action
  - upload time

  These file-sync options can be applied to a specified AP, all APs, or all APs within a specified RF Domain or on all RF Domains.

  - `<DEVICE-NAME>` – Applies these parameters to the AP identified by the `<DEVICE-NAME>` parameter. Specify the AP’s hostname or MAC address.
  - `all` – Applies these parameters to all APs
  - `rf-domain [DOMAIN-NAME]|all]` – Applies these parameters to all APs in a specified RF Domain or in all RF Domains
    - `<DOMAIN-NAME>` – Select to apply to APs within the RF Domain identified by the `<DOMAIN-NAME>` parameter. Specify the RF Domain’s name.
    - `all` – Select to apply these parameters to APs in all RF Domains
  - `from-controller` – Optional. Loads certificate to the APs from the adopting controller and not the RF Domain manager

  After specifying the access points to load certificate, specify the following options: reset-radio and upload-time.

  **reset-radio**

  This keyword is recursive and applicable to all of the above parameters.
  Optional. Resets the radio after file synchronization

  **upload-time <TIME>**

  This keyword is recursive and applicable to all of the above parameters.
  Optional. Schedules file upload at a specified time

  - `<TIME>` – Specify the time in the MM/DD/YYYY-HH:MM or HH:MM format. If no time is configured, the process is initiated as soon as the command is executed.

**Examples**

```
rfs7000-6DCD4B# file-sync wireless-bridge ap7131-11E6C4 upload-time 12/12/2015-12:30
```

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4-C7-99-6D-CD-4B</td>
<td>Success</td>
<td>Queued 1 APs to upload</td>
</tr>
</tbody>
</table>

```紧缺``
3.1.30 format

Privileged Exec Mode Commands

Formats a device’s compact flash file system

Supported in the following platforms:
  • Wireless Controllers — RFS7000

Syntax
format cf:

Parameters

- format cf:

Examples
rfs7000-37FABE#format cf:

  Warning: This will destroy the contents of compact flash.
  Do you want to continue [y/n]? n

rfs7000-37FABE#
### 3.1.31 halt

*Privileged Exec Mode Commands*

Stops (halts) a device (access point, wireless controller, or service platform). Once halted, the system must be restarted manually.

This command stops the device immediately. No indications or notifications are provided while the device shuts down.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

`halt {force} {(on <DEVICE-NAME>))}

#### Parameters

- `halt {force} {(on <DEVICE-NAME>))

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>halt</code></td>
<td>Halts a device</td>
</tr>
<tr>
<td><code>force</code></td>
<td>Optional. Forces a device to halt ignoring in-progress operations, such as firmware upgrades, downloads, unsaved configuration changes, etc.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>The following keywords are recursive and applicable to the ‘force’ parameter:</td>
</tr>
<tr>
<td></td>
<td>• <code>on &lt;DEVICE-NAME&gt;</code> – Optional. Specifies the name of the device to be halted</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-NAME&gt;</code> – Enter the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

**Note:** If the device name is not specified, the logged device is halted.

#### Examples

```
rfst000-37FABE#halt on rfs7000-37FABE
rfs7000-37FABE#```
### 3.1.32 `join-cluster`

#### Privileged Exec Mode Commands

Adds a device (access point, wireless controller, or service platform), as cluster member, to an existing cluster of devices. Assign a static IP address to the device before adding to a cluster.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
join-cluster <IP> user <USERNAME> password <WORD> {level|mode}
join-cluster <IP> user <USERNAME> password <WORD> {level [1|2]|mode [active|standby]}
```

**Parameters**

- `join-cluster <IP> user <USERNAME> password <WORD> {level [1|2]|mode [active|standby]}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;IP&gt;</code></td>
<td>Specify the cluster member’s IP address.</td>
</tr>
<tr>
<td><code>user &lt;USERNAME&gt;</code></td>
<td>Specify a user account with super user privileges on the new cluster member.</td>
</tr>
<tr>
<td><code>password &lt;WORD&gt;</code></td>
<td>Specify password for the account specified in the user parameter.</td>
</tr>
<tr>
<td>`level [1</td>
<td>2]`</td>
</tr>
<tr>
<td></td>
<td>- 1 – Configures level 1 routing</td>
</tr>
<tr>
<td></td>
<td>- 2 – Configures level 2 routing</td>
</tr>
<tr>
<td>`mode [active</td>
<td>standby]`</td>
</tr>
<tr>
<td></td>
<td>- active – Configures cluster mode as active</td>
</tr>
<tr>
<td></td>
<td>- standby – Configures cluster mode as standby</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

To add a device to an existing cluster:
- Configure a static IP address on the device (access point, wireless controller, or service platform).
- Provide username and password for superuser, network admin, system admin, or operator accounts.

After adding the device to a cluster, execute the “write memory” command to ensure the configuration persists across reboots.

**Examples**

```plaintext
rfs6000-6DB5D4#join-cluster 192.168.13.16 user admin password superuser level 1
  mode standby
  ... connecting to 192.168.13.16
  ... applying cluster configuration
  ... committing the changes
  ... saving the changes
  [OK]
rfs6000-6DB5D4#
```

```plaintext
rfs6000-6DB5D4#show context
```

```plaintext
  ! Configuration of RFS6000 version 5.8.4.0-008D
  !
  ! version 2.5
  !
  ```
interface ge1
  switchport mode access
  switchport access vlan 1
interface vlan1
  ip address 192.168.13.16/24
  ip dhcp client request options all
  no ipv6 enable
  no ipv6 request-dhcpv6-options
cluster name TechPubs
cluster mode standby
cluster member ip 192.168.13.16 level 1
logging on
logging console warnings
logging buffered warnings
!
!
end
rfs6000-6DB5D4#

Related Commands

<table>
<thead>
<tr>
<th>command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cluster</td>
<td>Initiates the cluster context. The cluster context provides centralized management to configure all cluster members from any one member.</td>
</tr>
<tr>
<td>create-cluster</td>
<td>Creates a new cluster on a specified device</td>
</tr>
</tbody>
</table>
Privileged Exec Mode Commands

Establishes or brings down an L2TPv3 tunnel

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

- `l2tpv3 tunnel [〈TUNNEL-NAME〉|all]`
- `l2tpv3 tunnel 〈TUNNEL-NAME〉 [down|session|up]
  on 〈DEVICE-NAME〉`
- `l2tpv3 tunnel 〈TUNNEL-NAME〉 [down|up] {on 〈DEVICE-NAME〉}
  session 〈SESSION-NAME〉 [down|up] {on 〈DEVICE-NAME〉}
- `l2tpv3 tunnel all [down|up] {on 〈DEVICE-NAME〉}

Parameters

- `l2tpv3 tunnel 〈TUNNEL-NAME〉 [down|up] {on 〈DEVICE-NAME〉}`
  Establishes or brings down an L2TPv3 tunnel
  - `〈TUNNEL-NAME〉` — Specify the tunnel name.
  - `down` — Brings down the specified tunnel
  - `up` — Establishes the specified tunnel
  - `on 〈DEVICE-NAME〉` — Optional. Establishes or brings down a tunnel on a specified device
    - `〈DEVICE-NAME〉` — Specify the name of the AP, wireless controller, or service platform.

- `l2tpv3 tunnel 〈TUNNEL-NAME〉 session 〈SESSION-NAME〉 [down|up] {on 〈DEVICE-NAME〉}
  Establishes or brings down a session in the specified tunnel
  - `〈TUNNEL-NAME〉` — Specify the tunnel name.
  - `〈SESSION-NAME〉` — Specify the session name.
  - `down` — Brings down the specified tunnel session
  - `up` — Establishes the specified tunnel session
  - `on 〈DEVICE-NAME〉` — Optional. Establishes or brings down a tunnel session on a specified device
    - `〈DEVICE-NAME〉` — Specify the name of the AP, wireless controller, or service platform.

- `l2tpv3 tunnel all [down|up] {on 〈DEVICE-NAME〉}
  Establishes or brings down all L2TPv3 tunnels
  - `down` — Brings down all tunnels
  - `up` — Establishes all tunnels
  - `on 〈DEVICE-NAME〉` — Optional. Establishes or brings down all tunnels on a specified device
    - `〈DEVICE-NAME〉` — Specify the name of the AP, wireless controller, or service platform.
Examples

rfs7000-37FABE#l2tpv3 tunnel Tunnel1 session Tunnel1Session1 up on rfs7000-37FABE

NOTE: For more information on the L2TPv3 tunnel configuration mode and commands, see Chapter 22, L2TPV3-POLICY.
3.1.34 logging

Privileged Exec Mode Commands

Modifies message logging settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

logging monitor {<0-7>|alerts|critical|debugging|emergencies|errors|informational|notifications|warnings}

Parameters

- logging monitor {<0-7>|alerts|critical|debugging|emergencies|errors|informational|notifications|warnings}

<table>
<thead>
<tr>
<th>monitor</th>
<th>Sets terminal lines logging levels. The logging severity levels can be set from 0 - 7. The system configures default settings, if no logging severity level is specified.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;0-7&gt; – Optional. Enter the logging severity level from 0 - 7. The various levels and their implications are:</td>
</tr>
<tr>
<td></td>
<td>• alerts – Optional. Immediate action needed (severity=1)</td>
</tr>
<tr>
<td></td>
<td>• critical – Optional. Critical conditions (severity=2)</td>
</tr>
<tr>
<td></td>
<td>• debugging – Optional. Debugging messages (severity=7)</td>
</tr>
<tr>
<td></td>
<td>• emergencies – Optional. System is unusable (severity=0)</td>
</tr>
<tr>
<td></td>
<td>• errors – Optional. Error conditions (severity=3)</td>
</tr>
<tr>
<td></td>
<td>• informational – Optional. Informational messages (severity=6)</td>
</tr>
<tr>
<td></td>
<td>• notifications – Optional. Normal but significant conditions (severity=5)</td>
</tr>
<tr>
<td></td>
<td>• warnings – Optional. Warning conditions (severity=4)</td>
</tr>
</tbody>
</table>

Note: Ensure that the logging module is enabled, before configuring the message logging level. To enable message logging, in the device’s configuration mode, execute the `logging > on` command. Message logging can also be enabled on a profile.

Examples

rfs4000-229D58(config-device-00-23-68-22-9D-58)#logging on

rfs4000-229D58#logging monitor debugging

rfs4000-229D58#show logging

Logging module: enabled
Aggregation time: disabled
Console logging: level debugging
Monitor logging: level debugging
Buffered logging: level warnings
Syslog logging: level warnings
Facility: local7

Log Buffer (804 bytes):

May 30 11:23:13 2015: rfs4000-229D58 : %NSM-4-IFUP: Interface ge4 is up
May 30 11:23:11 2015: rfs4000-229D58 : %NSM-4-IFUP: Interface ge4 is up
May 30 11:22:15 2015: rfs4000-229D58 : %NSM-4-IFDOWN: Interface ge4 is down
May 30 08:41:59 2015: rfs4000-229D58 : %NSM-4-IFUP: Interface ge4 is up
May 30 08:41:58 2015: rfs4000-229D58 : %NSM-4-IFUP: Interface ge4 is up
May 29 11:41:17 2015: rfs4000-229D58 : %NSM-4-IFUP: Interface ge4 is up
May 29 11:41:16 2015: rfs4000-229D58 : %NSM-4-IFUP: Interface ge4 is up
rfs4000-229D58#

Related Commands

| no       | Resets terminal lines logging levels |
### 3.1.35 mint

**Privileged Exec Mode Commands**

Uses MiNT protocol to perform a ping and traceroute to a remote device

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
mint [ping|traceroute]
mint ping <MINT-ID> {count <1-10000>|size <1-64000>|timeout <1-10>}
mint traceroute <MINT-ID> {destination-port <1-65535>|max-hops <1-255>|source-port <1-65535}|timeout <1-255>}
```

**Parameters**

- **mint ping <MINT-ID> {count <1-10000>|size <1-64000>|timeout <1-10>**

<table>
<thead>
<tr>
<th>ping &lt;MINT-ID&gt;</th>
<th>Sends a MiNT echo message to a specified destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>count &lt;1-10000&gt;</td>
<td>Optional. Sets the pings to the MiNT destination</td>
</tr>
<tr>
<td>size &lt;1-64000&gt;</td>
<td>Optional. Sets the MiNT payload size in bytes</td>
</tr>
<tr>
<td>timeout &lt;1-10&gt;</td>
<td>Optional. Sets a response time in seconds</td>
</tr>
</tbody>
</table>

- **mint traceroute <MINT-ID> {destination-port <1-65535>|max-hops <1-255>|source-port <1-65535}|timeout <1-255>**

<table>
<thead>
<tr>
<th>traceroute &lt;MINT-ID&gt;</th>
<th>Prints the route packets trace to a device</th>
</tr>
</thead>
<tbody>
<tr>
<td>destination-port &lt;1-65535&gt;</td>
<td>Optional. Sets the Equal-cost Multi-path (ECMP) routing destination port</td>
</tr>
<tr>
<td>max-hops &lt;1-255&gt;</td>
<td>Optional. Sets the maximum number of hops a traceroute packet traverses in the forward direction</td>
</tr>
<tr>
<td>source-port &lt;1-65535&gt;</td>
<td>Optional. Sets the ECMP source port</td>
</tr>
<tr>
<td>timeout &lt;1-255&gt;</td>
<td>Optional. Sets the minimum response time period</td>
</tr>
</tbody>
</table>
Examples

rfs4000-229D58#mint ping 68.88.0D.A7
MiNT ping 68.88.0D.A7 with 64 bytes of data.
  Response from 68.88.0D.A7: id=1 time=0.364 ms
  Response from 68.88.0D.A7: id=2 time=0.333 ms
  Response from 68.88.0D.A7: id=3 time=0.368 ms

--- 68.88.0D.A7 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.333/0.355/0.368 ms
rfs4000-229D58#
### Privileged Exec Mode Commands

**mkdir**

Creates a new directory in the file system

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
mkdir <DIR>
```

**Parameters**

- `mkdir <DIR>`

| <DIR> | Specify a directory name.  
|-------|--------------------------  
| **Note:** A directory, specified by the <DIR> parameter, is created within the file system.

**Examples**

```
rfs4000-229D58#dir  
Directory of flash:/.

  drwx  Mon Jun  9 05:13:12 2014  log
  drwx  Sat Jan 1 05:30:09 2000  configs
  drwx  Sat Jan 1 05:30:08 2000  cache
  drwx  Mon May  5 04:50:06 2014  crashinfo
  drwx  Mon Jun  9 05:09:57 2014  archived_logs
  drwx  Sat Jan 1 05:30:08 2000  upgrade
  drwx  Sat Jan 1 05:30:09 2000  hotspot
  drwx  Sat Jan 1 05:30:09 2000  floorplans
  -rw- 137728  Thu Jun  5 09:41:00 2014  in.tar
  drwx  Sat Jan 1 05:30:09 2000  startuplog
  -rw- 176128  Fri Feb 15 20:02:51 2013  out.tar
```

```
rfs4000-229D58#  
rfs4000-229D58#mkdir test  
rfs4000-229D58#dir  
Directory of flash:/.

  drwx  Mon Jun  9 05:13:12 2014  log
  drwx  Tue Jun 10 08:58:13 2014  test
  drwx  Sat Jan 1 05:30:09 2000  configs
  drwx  Sat Jan 1 05:30:08 2000  cache
  drwx  Mon May  5 04:50:06 2014  crashinfo
  drwx  Mon Jun  9 05:09:57 2014  archived_logs
  drwx  Sat Jan 1 05:30:08 2000  upgrade
  drwx  Sat Jan 1 05:30:09 2000  hotspot
  drwx  Sat Jan 1 05:30:09 2000  floorplans
  -rw- 137728  Thu Jun  5 09:41:00 2014  in.tar
  drwx  Sat Jan 1 05:30:09 2000  startuplog
  -rw- 176128  Fri Feb 15 20:02:51 2013  out.tar
```

```
rfs4000-229D58#  
```
3.37 **more**

*Privileged Exec Mode Commands*

Displays files on the device’s file system. This command navigates and displays specific files in the device’s file system. Provide the complete path to the file `more <file>`.

The `more` command also displays the startup configuration file.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`more <FILE>`

**Parameters**

- `more <FILE>`

**Examples**

```
rfs4000-229D58#more flash:/archived_logs/startup.1.log
23-38-04-06-08-14
Mar 16 05:07:15 2015: %PM-6-PROCSTART: Starting process "/usr/sbin/logd"
Mar 16 05:07:15 2015: %PM-6-PROCSTART: Starting process "/usr/sbin/isDiag"
Mar 16 05:07:21 2015: %PM-6-PROCSTART: Starting process "/usr/sbin/rim"
Mar 16 05:07:42 2015: %PM-6-PROCSTART: Starting process "/etc/init.d/cfgd"
Mar 16 05:07:44 2015: %PM-6-PROCSTART: Starting process "/usr/sbin/ssm"
Mar 16 05:07:45 2015: %PM-6-PROCSTART: Starting process "/usr/sbin/nsm"
Mar 16 05:07:45 2015: %PM-6-PROCSTART: Starting process "/etc/init.d/dpd2.init"
Mar 16 05:07:45 2015: %PM-6-PROCSTART: Starting process "/usr/sbin/hsd"
Mar 16 05:07:45 2015: %PM-6-PROCSTART: Starting process "/etc/init.d/anald.init"
```

```
--More--
rfs4000-229D58#
```
3.1.38 no

Privileged Exec Mode Commands

Use the no command to revert a command or a set of parameters to their default. This command is useful to turn off an enabled feature or to revert to default settings.

The no commands have their own set of parameters that can be reset. These parameters depend on the context in which the command is being used.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
no [adoption|captive-portal|cpe|crypto|debug|logging|page|raid|service|
terminal|upgrade|virtual-machine|wireless]
```

```
no adoption {on <DEVICE-OR-DOMAIN-NAME>}
```

NOTE: The no > adoption command resets the adoption state of a specified device (and all devices adopted to it) or devices within a specified RF Domain. When executed without specifying the device or RF Domain, the command resets the adoption state of the logged device and all devices, if any, adopted to it.

```
nocaptive-portal client [captive-portal <CAPTIVE-PORTAL-NAME>|mac <MAC>] 
{on <DEVICE-OR-DOMAIN-NAME>}
```

```
nocrypto pki [server|trustpoint] 
nocrypto pki [server|trustpoint] <TRUSTPOINT-NAME> {del-key {on <DEVICE-NAME>} | 
on <DEVICE-NAME>}
```

```
nologging monitor
```

```
nopage
```

```
noservice [block-adopter-config-update|locator|snmp|ssm|wireless] 
noservice block-adopter-config-update 
noservice locator {on <DEVICE-NAME>}
noservice snmp sysoid wing5 
noservice ssm trace pattern {<WORD>} {(on <DEVICE-NAME>)}
noservice wireless [trace pattern {<WORD>} {(on <DEVICE-NAME>)}]
unsanctioned ap air-terminate <BSSID> {on <DOMAIN-NAME>}
noterminal [length|width]
```

```
noupgrade <PATCH-NAME> {on <DEVICE-NAME>}
```

```
nowireless client [all|<MAC>] 
nowireless client all {filter|on}
nowireless client all {on <DEVICE-OR-DOMAIN-NAME>} {filter [wlan <WLAN-NAME>]} 
nowireless client mac <MAC> {on <DEVICE-OR-DOMAIN-NAME>}
```

The following command is available only on the RFS4000, RFS7000, NX45XX, NX65XX, and NX9000 series service platforms:

```
nocpe led cpe [<1-24>|all] {on <T5-DEVICE-NAME>}
```
The following command is available only on the NX45XX, NX65XX, and NX9000 series service platforms:
no virtual-machine assign-usb-ports \{on <DEVICE-NAME>\}

The following commands are available only on the NX9000 series service platforms:
no raid locate

**Parameters**
- no <PARAMETERS>

| no <PARAMETERS> | Resets or reverts settings based on the parameters passed |

**Usage Guidelines**
The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

**Examples**
rfs7000-37FABE# no adoption
rfs7000-37FABE#

rfs7000-37FABE# no page
rfs7000-37FABE#
3.1.39 on

Privileged Exec Mode Commands

Executes the following commands in the RF Domain context: clrscr, do, end, exit, help, service, and show

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

on rf-domain [<RF-DOMAIN-NAME>|all]

Parameters

- on rf-domain [<RF-DOMAIN-NAME>|all]

| on rf-domain [<RF-DOMAIN-NAME>|all] | Enters the RF Domain context based on the parameter specified |
|--------------------------------------|-------------------------------------------------------------|
|                                    | • <RF-DOMAIN-NAME> — Specify the RF Domain name. Enters the specified RF Domain context. |
|                                    | • all — Specifies all RF Domains. |

Examples

nx9500-6C8809# on rf-domain TechPubs
nx9500-6C8809(TechPubs)#

nx9500-6C8809(TechPubs)#?

on RF-Domain Mode commands:

  clrscr  Clears the display screen
  do      Run commands from Exec mode
  end     End current mode and change to EXEC mode
  exit    End current mode and down to previous mode
  help    Description of the interactive help system
  service Service Commands
  show    Show running system information

nx9500-6C8809(TechPubs)#

nx9500-6C8809(TechPubs)#show adoption timeline on default/ap7532-80C2AC

<table>
<thead>
<tr>
<th>AP-NAME</th>
<th>RF-DOMAIN</th>
<th>LAST-ADOPTION-TIMESTAMP</th>
<th>ADOPTED-SINCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>nx4500-5CFA2B</td>
<td>default</td>
<td>2015-04-08 09:50:02</td>
<td>9 days 01:13:54</td>
</tr>
<tr>
<td>nx4500-5CFA8E</td>
<td>default</td>
<td>2015-04-08 09:49:48</td>
<td>9 days 01:14:08</td>
</tr>
</tbody>
</table>

Total number of devices displayed: 2

nx9500-6C8809(TechPubs)#
### 3.1.40 opendns

Privileged Exec Mode Commands

Retrieves the OpenDNS device-id from the OpenDNS site

This command integrates access points and controllers with OpenDNS. It obtains the device-id (16 character hexadecimal string) from OpenDNS. This device-id is configured under all WLANs that are to be OpenDNS enabled. When configured and enabled on a WLAN, DNS queries from all wireless clients on the WLAN are redirected to OpenDNS (208.67.220.220 or 208.67.222.222) resolvers. These OpenDNS resolvers act as proxy DNS servers, and also provide additional features, such as Web filtering, performance improvements, etc.

#### Syntax

```
opendns username <USERNAME> password <OPENDNS-PSWD> label <LABEL>
```

#### Parameters

- **opendns username <USERNAME> password <OPENDNS-PSWD> label <LABEL>**
  
  **username <USERNAME>**
  
  Configures the OpenDNS user name (should be valid username registered with OpenDNS)
  
  - **<USERNAME>** – Provide the OpenDNS user name.

- **password <OPENDNS-PSWD>**
  
  Configures the password associated with the user configured in the previous step
  
  - **<OPENDNS-PSWD>** – Provide the OpenDNS password for the user.

- **label <LABEL>**
  
  Configures the network label. This the label (the user friendly name) of your network, and should be the same as the label (name) configured on the OpenDNS portal.
  
  - **<LABEL>** – Specify your network label.
  
  **Note:** For every unique set of username, password, and label only one device-id is returned. Apply this device-id in WLANs that are to be OpenDNS enabled. For information on configuring the device-id in the WLAN context, see *opendns*.
Usage Guidelines

Use your OpenDNS credentials to logon to the opendns.org site and use the labels, edit settings, and customize content filtering options to configure Web filtering settings.

Examples

ap7131-E6D512#opendns username bob@examplecompany.com password opendns label company_name
Connecting to OpenDNS server...
device_id = 0014AADP8EDC6C59
ap7131-E6D512#
### 3.1.41 page

*Toggles controller paging. Enabling this command displays the CLI command output page by page, instead of running the entire output at once.*

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

page

**Parameters**

None

**Examples**

```bash
rfs7000-37FABE#page
rfs7000-37FABE#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables controller paging</td>
</tr>
</tbody>
</table>
3.1.42 ping

Privileged Exec Mode Commands

Sends Internet Controller Message Protocol (ICMP) echo messages to a user-specified location.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
ping <IP/HOSTNAME> {count <1-10000>|dont-fragment {count|size}|size <1-64000>|source [<IP]|pppoe|vlan <1-4094>|wwan}]
```

Parameters
- `<IP/HOSTNAME>` Specify the destination IP address or hostname to ping. When entered without any parameters, this command prompts for an IP address or a hostname.
- `count <1-10000>` Optional. Sets the pings to the specified destination
  - `<1-10000>` – Specify a value from 1 - 10000. The default is 5.
- `dont-fragment {count|size}` Optional. Sets the dont-fragment bit in the ping packet. Packets with the dont-fragment bit specified, are not fragmented. When a packet, with the dont-fragment bit specified, exceeds the specified Maximum Transmission Unit (MTU) value, an error message is sent from the device trying to fragment it.
  - `count <1-10000>` – Sets the pings to the specified destination from 1 - 10000. The default is 5.
  - `size <1-64000>` – Sets the size of ping payload size from 1 - 64000 bytes. The default is 100 bytes.
- `size <1-64000>` Optional. Sets the ping packet's size in bytes
  - `<1-64000>` – Specify the ping payload size from 1 - 64000 bytes. The default is 100 bytes.
- `source [<IP]|pppoe|vlan <1-4094]|wwan]` Optional. Sets the source address or interface name. This is the source of the ICMP packet to the specified destination.
  - `<IP>` – Specifies the source IP address
  - `pppoe` – Selects the PPP over Ethernet interface
  - `vlan <1-4094>` – Selects the VLAN interface from 1 - 4094
  - `wwan` – Selects the wireless WAN interface
Examples

rfs7000-37FABE#ping 172.16.10.4 count 6
PING 172.16.10.4 (172.16.10.4) 100(128) bytes of data.
108 bytes from 172.16.10.4: icmp_seq=1 ttl=64 time=3.93 ms
108 bytes from 172.16.10.4: icmp_seq=2 ttl=64 time=0.367 ms
108 bytes from 172.16.10.4: icmp_seq=3 ttl=64 time=0.328 ms
108 bytes from 172.16.10.4: icmp_seq=4 ttl=64 time=0.295 ms
108 bytes from 172.16.10.4: icmp_seq=5 ttl=64 time=0.340 ms
108 bytes from 172.16.10.4: icmp_seq=6 ttl=64 time=0.371 ms
--- 172.16.10.4 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5001ms
rtt min/avg/max/mdev = 0.295/0.939/3.936/1.340 ms
rfs7000-37FABE#

rfs7000-6DCD4B#ping 10.2.0.99 source 172.18.0.2
PING 10.2.0.99 (10.2.0.99) from 172.18.0.2 : 100(128) bytes of data.
108 bytes from 10.2.0.99: icmp_seq=1 ttl=63 time=1.16 ms
108 bytes from 10.2.0.99: icmp_seq=2 ttl=63 time=0.744 ms
108 bytes from 10.2.0.99: icmp_seq=3 ttl=63 time=0.648 ms
108 bytes from 10.2.0.99: icmp_seq=4 ttl=63 time=0.662 ms
108 bytes from 10.2.0.99: icmp_seq=5 ttl=63 time=0.651 ms
--- 10.2.0.99 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 3998ms
rtt min/avg/max/mdev = 0.648/0.774/1.168/0.202 ms
rfs7000-6DCD4B#
### 3.1.43 ping6

**Privileged Exec Mode Commands**

Sends ICMPv6 echo messages to a user-specified IPv6 address

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ping6 <IPv6/HOSTNAME> {<INTF-NAME>|count <1-10000>|size <1-64000>}
```

**Parameters**

- `ping <IPv6/HOSTNAME> {<INTF-NAME>|count <1-10000>|size <1-64000>}`

<table>
<thead>
<tr>
<th><code>&lt;IPv6/HOSTNAME&gt;</code></th>
<th>Specify the destination IPv6 address or hostname.</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;INTF-NAME&gt;</code></td>
<td>Optional. Specify the interface name for link local/broadcast address</td>
</tr>
<tr>
<td><code>count &lt;1-10000&gt;</code></td>
<td>Optional. Sets the pings to the specified IPv6 destination</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;1-10000&gt;</code> – Specify a value from 1 - 10000. The default is 5.</td>
</tr>
<tr>
<td><code>size &lt;1-64000&gt;</code></td>
<td>Optional. Sets the IPv6 ping payload size in bytes</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;1-64000&gt;</code> – Specify the ping payload size from 1 - 64000. The default is 100 bytes.</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

To configure a device’s IPv6 address, in the VLAN interface configuration mode, use the `ipv6 > address` `<IPv6-ADDRESS>` command. After configuring the IPv6 address, use the `ipv6 > enable` command to enable IPv6. For more information, see `ipv6`.

**Examples**

```
rfs4000-1B3596#ping6  2001:10:10:10:10:10:10:2  count 6 size 200
208 bytes from 2001:10:10:10:10:10:10:2: icmp_seq=1 ttl=64 time=0.509 ms
208 bytes from 2001:10:10:10:10:10:10:2: icmp_seq=2 ttl=64 time=0.323 ms
208 bytes from 2001:10:10:10:10:10:10:2: icmp_seq=3 ttl=64 time=0.318 ms
208 bytes from 2001:10:10:10:10:10:10:2: icmp_seq=4 ttl=64 time=0.317 ms
208 bytes from 2001:10:10:10:10:10:10:2: icmp_seq=5 ttl=64 time=0.314 ms
208 bytes from 2001:10:10:10:10:10:10:2: icmp_seq=6 ttl=64 time=0.318 ms
6 packets transmitted, 6 received, 0% packet loss, time 4999ms
rtt min/avg/max/mdev = 0.314/0.349/0.509/0.075 ms
rfs4000-1B3596#
```

3.1.44 pwd

Privileged Exec Mode Commands

Displays the full path of the present working directory, similar to the UNIX pwd command

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

pwd

Parameters

None

Examples

rfs4000-229D58#pwd
flash:/
rfs4000-229D58#

rfs4000-229D58#dir
Directory of flash:/.

drwx Mon Feb 8 17:37:21 2016 log
drwx Sat Jan 1 05:30:08 2000 configs
drwx Sat Jan 1 05:30:08 2000 cache
drwx Thu Nov 12 17:55:02 2015 crashinfo
drwx Mon Feb 8 17:34:21 2016 archived_logs
drwx Sat Jan 1 05:30:08 2000 upgrade
drwx Sat Jan 1 05:30:23 2000 hotspot
drwx Sat Jan 1 05:30:08 2000 floorplans
drwx Sat Jan 1 05:30:08 2000 tmptpd

rfs4000-229D58#
3.1.45 **re-elect**

*Privileged Exec Mode Commands*

Re-elects the tunnel controller (wireless controller or service platform)

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
re-elect tunnel-controller {<WORD> {on <DEVICE-NAME>} | on <DEVICE-NAME>}
```

**Parameters**

- `re-elect tunnel-controller {<WORD> {on <DEVICE-NAME>} | on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>re-elect tunnel-controller</th>
<th>Re-elects the tunnel controller</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;WORD&gt;</code> {on <code>&lt;DEVICE-NAME&gt;</code>}</td>
<td>Optional. Re-elects the tunnel controller on all devices whose preferred tunnel controller name matches <code>&lt;WORD&gt;</code></td>
</tr>
<tr>
<td></td>
<td>• on <code>&lt;DEVICE-NAME&gt;</code> – Optional. Re-elects the tunnel controller on a specified device</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-NAME&gt;</code> – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE# re-elect tunnel-controller
OK
rfs7000-37FABE#
```
3.1.46 reload

Privalued Exec Mode Commands

Halts a device or devices and performs a warm reboot

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

reload {<DEVICE-MAC-OR-HOSTNAME>|at|cancel|force|in|on|staggered}

reload {at <TIME> <1-31> <MONTH> <1993-2035> {on <DEVICE-OR-DOMAIN-NAME>}}

reload {cancel} {on <DEVICE-OR-DOMAIN-NAME>}

reload {force} {(<DEVICE-MAC-OR-HOSTNAME>)|on <DOMAIN-NAME>|staggered}

reload {force} {on <DOMAIN-NAME> {staggered}}

reload {force} {containing <WORD>|exclude-controllers|exclude-rf-domain-manager|filter <DEVICE-TYPE>}

reload {in <1-999>} {list|on}

reload {in <1-999>} {list {<LINE>|all}|on <DEVICE-OR-DOMAIN-NAME>}

reload {on <DOMAIN-NAME>} {containing <WORD>|exclude-controllers|exclude-rf-domain-manager|filter <DEVICE-TYPE>}

reload {staggered} {(<DEVICE-MAC-OR-HOSTNAME>)|on <DOMAIN-NAME> {containing <WORD>|exclude-controllers|exclude-rf-domain-manager|filter <DEVICE-TYPE>}

Parameters

- reload {}<DEVICE-MAC-OR-HOSTNAME> Initiates device(s) reload and configures associated parameters
  - The following keyword is recursive and allows you to specify multiple devices:
  - <DEVICE-MAC-OR-HOSTNAME> – Optional. Reloads a specified device(s), identified by the <DEVICE-MAC-OR-HOSTNAME> keyword. Specify the device’s hostname or MAC address.
  - Note: If no device is specified, the system reloads the logged device.

- reload {at <TIME> <1-31> <MONTH> <1993-2035> {on <DEVICE-OR-DOMAIN-NAME>}}

reload at

- <TIME> Specifies the time in the HH:MM:SS format
- <1-31> Specifies the day of the month from 1 - 31
- <MONTH> Specifies the month from Jan - Dec
### WiNG 5.8.4 CLI Reference Guide

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;1993-2035&gt;</code></td>
<td>Specifies the year from 1993 - 2035. It should be a valid 4 digit year.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>Optional. Performs reload at the scheduled time, on a specified device or all devices within a specified RF Domain</td>
</tr>
<tr>
<td>- <code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Specify the name of the AP, wireless controller, service platform, or RF Domain. When a RF Domain name is provided, all devices within the specified RF Domain are reloaded at the scheduled time.</td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> If no device is specified, the reload is scheduled on the logged device.</td>
<td></td>
</tr>
<tr>
<td><code>reload cancel {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</code></td>
<td>Cancels pending/scheduled reloads of device(s)</td>
</tr>
<tr>
<td>- <code>cancel</code> – Optional. Cancels all pending reloads</td>
<td></td>
</tr>
<tr>
<td>- <code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Optional. Cancels reloads pending on a specified device or all devices within a specified RF Domain</td>
<td></td>
</tr>
<tr>
<td>- <code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> If no device is specified, the system cancels reloads pending on the logged device.</td>
<td></td>
</tr>
<tr>
<td><code>reload force {&lt;DEVICE-MAC-OR-HOSTNAME&gt;}</code></td>
<td>Initiates device(s) reload and configures associated parameters</td>
</tr>
<tr>
<td>- <code>force</code> – Optional. Forces device(s) to reload, while ignoring conditions like upgrade in progress, unsaved changes, etc. Use the options provided to force a reload on a specified device or all devices in a RF Domain.</td>
<td></td>
</tr>
<tr>
<td><code>&lt;DEVICE-MAC-OR-HOSTNAME&gt;</code></td>
<td>This keyword is recursive and allows you to specify multiple devices.</td>
</tr>
<tr>
<td>- <code>&lt;DEVICE-MAC-OR-HOSTNAME&gt;</code> – Optional. Forces a reload on a specified device identified by the <code>&lt;DEVICE-MAC-OR-HOSTNAME&gt;</code> keyword. Specify the device’s hostname or MAC address. When executed, the specified device(s) are forced to halt and a warm reboot is performed.</td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> If no device is specified, the system forcefully reloads the logged device.</td>
<td></td>
</tr>
<tr>
<td><code>reload {force} {on &lt;DOMAIN-NAME&gt; [staggered] [staggered {&lt;DEVICE-MAC-OR-HOSTNAME&gt;}] [containing &lt;WORD&gt;] [exclude-controllers] [exclude-rf-domain-manager] [filter &lt;DEVICE-TYPE&gt;]</code></td>
<td>Initiates device(s) reload and configures associated parameters</td>
</tr>
<tr>
<td>- <code>force</code> – Optional. Forces device(s) to reload, while ignoring conditions like upgrade in progress, unsaved changes, etc. Use the options provided to force a reload on a specified device or all devices in a RF Domain.</td>
<td></td>
</tr>
<tr>
<td><code>on &lt;DOMAIN-NAME&gt; staggered</code></td>
<td>Optional. Forces a reload on all devices in a RF Domain</td>
</tr>
<tr>
<td>- <code>&lt;DOMAIN-NAME&gt;</code> – Optional. Specify the name of the RF Domain. When executed, all devices within the specified RF Domain are forced to halt and a warm reboot is performed.</td>
<td></td>
</tr>
<tr>
<td>- <code>staggered</code> – Optional. Enables staggered reload of devices (one at a time) without network impact. Use this option when rebooting multiple devices within an RF Domain. When executed, all devices within the specified RF Domain are forced to halt and reboot in a staggered manner.</td>
<td></td>
</tr>
</tbody>
</table>
### Privileged Exec Mode Commands

#### Staggered Reload

<table>
<thead>
<tr>
<th>Staggered Reload Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;DEVICE-MAC-OR-HOSTNAME&gt;</code></td>
</tr>
<tr>
<td>on <code>&lt;DOMAIN-NAME&gt;</code></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> If no device or RF Domain is specified, the system forcefully reloads the logged device.</td>
</tr>
</tbody>
</table>

#### Reload in `<1-999>`

<table>
<thead>
<tr>
<th>Reload Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;1-999&gt;</code> Initiate device(s) reload and configures associated parameters</td>
</tr>
<tr>
<td>- in – Optional. Performs a reload after a specified time period</td>
</tr>
<tr>
<td>- <code>&lt;1-999&gt;</code> – Specify the time from 1 - 999 minutes.</td>
</tr>
</tbody>
</table>

#### List `<LINE>` or all

<table>
<thead>
<tr>
<th>List Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;LINE&gt;</code></td>
</tr>
<tr>
<td>- <code>&lt;LINE&gt;</code> – Optional. Reloads listed devices. List all devices (to be reloaded) separated by a space.</td>
</tr>
<tr>
<td>- all – Optional. Reloads all devices adopted by this controller</td>
</tr>
</tbody>
</table>

#### Reload on `<DEVICE-OR-DOMAIN-NAME>`

<table>
<thead>
<tr>
<th>Reload Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
</tr>
<tr>
<td>- <code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

#### Reload on `<DOMAIN-NAME>`

<table>
<thead>
<tr>
<th>Reload Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;DOMAIN-NAME&gt;</code></td>
</tr>
<tr>
<td>- on <code>&lt;DOMAIN-NAME&gt;</code> – Optional. Enables reload of all devices in a RF Domain</td>
</tr>
<tr>
<td>- <code>&lt;DOMAIN-NAME&gt;</code> – Specify the name of the RF Domain. When executed, all devices within the specified RF Domain are immediately halted and a warm reboot is performed.</td>
</tr>
<tr>
<td><strong>Note:</strong> If no RF Domain is specified, the system reloads the logged device.</td>
</tr>
</tbody>
</table>
When reloading devices in a RF Domain, you can use following options to filter specific devices or device types:

- **containing <WORD>** – Optional. Filters out devices containing a specified sub-string in their hostnames.
- **<WORD>** – Optional. Provide the sub-string to match. All devices having hostnames containing the provided sub-string are filtered and forcefully reloaded.
- **exclude-controllers** – Optional. Excludes all controllers in the specified RF Domain from the reload process.
- **exclude-rf-domain-manager** – Optional. Excludes the RF Domain manager from the reload process.
- **filter <DEVICE-TYPE>** – Optional. Filters devices by the device type specified. Select the type of device to reload. All devices, of the specified type, within the specified RF Domain, are forcefully reloaded.

- **<DEVICE-TYPE>** – Select the type of device to reload. The options are: AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RF7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, VX9000, t5.

- **<DEVICE-MAC-OR-HOSTNAME>** – Optional. Performs staggered reload on specified device(s) identified by the <DEVICE-MAC-OR-HOSTNAME> keyword. Specify the device's hostname or MAC address. This is a recursive keyword that allows you to specify multiple devices. When executed, the specified device(s) are halted and a warm reboot is performed. Multiple devices are halted and rebooted one at a time without impacting network functioning.

- **<DOMAIN-NAME>** – Optional. Performs staggered reload of all devices in a RF Domain. Specify the name of the RF Domain. When executed, devices in the specified RF Domain are halted and rebooted one at a time without impacting network functioning. Use additional filter options to filter devices in the specified RF Domain.

**Note:** If no device or RF Domain is specified, the system reloads the logged device.

### Example

**reload staggered**

```plaintext
reload staggered {{<DEVICE-MAC-OR-HOSTNAME>} | on <DOMAIN-NAME> } {containing <WORD> | exclude-controllers | exclude-rf-domain-manager | filter <DEVICE-TYPE>}
```

**Use one of the following options to specify a single device, multiple devices, or a RF Domain**

- **<DEVICE-MAC-OR-HOSTNAME>** – Optional. Performs staggered reload on specified device(s) identified by the <DEVICE-MAC-OR-HOSTNAME> keyword. Specify the device’s hostname or MAC address. This is a recursive keyword that allows you to specify multiple devices. When executed, the specified device(s) are halted and a warm reboot is performed. Multiple devices are halted and rebooted one at a time without impacting network functioning.

- **<DOMAIN-NAME>** – Optional. Performs staggered reload of all devices in a RF Domain. Specify the name of the RF Domain. When executed, devices in the specified RF Domain are halted and rebooted one at a time without impacting network functioning. Use additional filter options to filter devices in the specified RF Domain.

**Note:** If no device or RF Domain is specified, the system reloads the logged device.

### Example

**reload staggered**

```plaintext
reload staggered {{<DEVICE-MAC-OR-HOSTNAME>} | on <DOMAIN-NAME> } {containing <WORD> | exclude-controllers | exclude-rf-domain-manager | filter <DEVICE-TYPE>}
```

**contd..**
### Examples

```
rfs7000-6DCD4B#reload at 12:30:00 31 Mar 2015 on rfs6000-81742D
Reload scheduled at 2015-03-31 12:30:00 UTC ...
rfs7000-6DCD4B#
```

```rfs7000-6DCD4B#reload cancel on rfs6000-81742D
Scheduled reload cancelled.
rfs7000-6DCD4B#```

The following example schedules a reload on all non-controller devices in the RF Domain 'default':

```
rfs7000-6DCD4B#reload on default exclude-controllers
ap8132-711728: OK
rfs7000-6DCD4B#```

- exclude-rf-domain-manager – Optional. Excludes the RF Domain manager from the reload process
- filter <DEVICE-TYPE> – Optional. Filters devices by the device type specified. Select the type of device. All devices, of the specified type, within the specified RF Domain, are reloaded.
- <DEVICE-TYPE> – Select the type of device to reload. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, VX9000, t5.
3.1.47 rename

Privileged Exec Mode Commands

Renames a file in the devices' file system

Supported in the following platforms:

• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

rename <OLD-FILE-NAME> <NEW-FILE-NAME>

Parameters

• rename <OLD-FILE-NAME> <NEW-FILE-NAME>

<table>
<thead>
<tr>
<th>&lt;OLD-FILE-NAME&gt;</th>
<th>Specify the file to rename.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;NEW-FILE-NAME&gt;</td>
<td>Specify the new file name.</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58#dir
Directory of flash:/.

    drwx    Wed Jan 30 02:45:10 2014   log
    drwx    Sat Jan  1 00:00:09 2000   configs
    drwx    Sat Jan  1 00:00:08 2000   cache
    drwx    Wed Jan 16 22:26:53 2014   crashinfo
    drwx    Fri Feb 15 14:50:49 2014   testdir
    drwx    Sat Jan  1 00:00:08 2000   upgrade
    drwx    Sat Jan  1 00:00:09 2000   hotspot
    drwx    Sat Jan  1 00:00:09 2000   floorplans
    drwx    Sat Jan  1 00:00:09 2000   startuplog
    -rw-   176128    Fri Feb 15 14:32:51 2014   out.tar

rfs4000-229D58#

rfs4000-229D58#rename flash:/testdir/ Final
rfs4000-229D58#

rfs4000-229D58#dir
Directory of flash:/.

    drwx    Wed Jan 30 02:45:10 2014   log
    drwx    Sat Jan  1 00:00:09 2000   configs
    drwx    Sat Jan  1 00:00:08 2000   cache
    drwx    Fri Feb 15 14:50:49 2014   Final
    drwx    Sat Jan  1 00:00:08 2000   crashinfo
    drwx    Wed Jan 16 22:26:53 2014   archived_logs
    drwx    Sat Jan  1 00:00:09 2000   hotspot
    drwx    Sat Jan  1 00:00:09 2000   floorplans
    drwx    Sat Jan  1 00:00:09 2000   startuplog
    -rw-   176128    Fri Feb 15 14:32:51 2014   out.tar

rfs4000-229D58#
3.1.48 rmdir

Privileged Exec Mode Commands

Deletes an existing directory from the file system (only empty directories can be removed)

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
rmdir <DIR>

Parameters
- rmdir <DIR>

<table>
<thead>
<tr>
<th>rmdir &lt;DIR&gt;</th>
<th>Specifies the directory name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: The directory, specified by the &lt;DIR&gt; parameter, is removed from the file system.</td>
<td></td>
</tr>
</tbody>
</table>

Examples
rfs4000-229D58#dir
Directory of flash:/.

    drwx    Tue Feb 2 16:57:25 2016    log
    drwx    Sat Jan 1 05:30:08 2000  configs
    drwx    Wed Feb 3 14:00:10 2016  Final
    drwx    Sat Jan 1 05:30:08 2000  cache
    drwx    Thu Nov 12 17:55:02 2015 crashinfo
    drwx    Tue Feb 2 16:54:20 2016  archived_logs
    drwx    Sat Jan 1 05:30:08 2000  upgrade
    drwx    Sat Jan 1 05:30:23 2000  hotspot
    drwx    Sat Jan 1 05:30:08 2000  floorplans
    drwx    Sat Jan 1 05:30:08 2000  tmptpd
rfs4000-229D58#
rfs4000-229D58#rmdir Final
rfs4000-229D58#
rfs4000-229D58#dir
Directory of flash:/.

    drwx    Tue Feb 2 16:57:25 2016    log
    drwx    Sat Jan 1 05:30:08 2000  configs
    drwx    Sat Jan 1 05:30:08 2000  cache
    drwx    Thu Nov 12 17:55:02 2015 crashinfo
    drwx    Tue Feb 2 16:54:20 2016  archived_logs
    drwx    Sat Jan 1 05:30:08 2000  upgrade
    drwx    Sat Jan 1 05:30:23 2000  hotspot
    drwx    Sat Jan 1 05:30:08 2000  floorplans
    drwx    Sat Jan 1 05:30:08 2000  tmptpd
rfs4000-229D58#
3.1.49 self

- Privileged Exec Mode Commands

Enters the logged device’s configuration context

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

self

Parameters

None

Examples

rfs7000-37FABE#self
Enter configuration commands, one per line. End with CNTL/Z.
rfs7000-37FABE(config-device-00-15-70-37-FA-BE)#
3.1.50 ssh

Privileged Exec Mode Commands

Opens a Secure Shell (SSH) connection between two network devices

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ssh <IP/HOSTNAME> <USERNAME> {<INF-NAME/LINK-LOCAL-ADD>}

Parameters

- ssh <IP/HOSTNAME> <USERNAME> {<INF-NAME/LINK-LOCAL-ADD>}

<IP/HOSTNAME>  Specify the remote system’s IP address or hostname.

<USERNAME>  Specify the name of the user requesting the SSH connection.

<INF-NAME/LINK-LOCAL-ADD>  Optional. Specify the interface’s name or link local address.

Usage Guidelines

To exit the other device’s context, use the command that is relevant to that device.

Examples

nx9500-6C8809#ssh 192.168.13.16 admin
admin@192.168.13.16’s password:
rfs6000-6DB5D4>

nx9500-6C8809#ssh 192.168.13.14 admin
The authenticity of host '192.168.13.14 (192.168.13.14)' can't be established.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.13.14' (RSA) to the list of known hosts.
admin@192.168.13.14’s password:
nx4500-5CFA8E>
3.1.51 **t5**

*Privileged Exec Mode Commands*

Executes following operations on a T5 device through the WiNG controller:

- copy, rename, and delete files on the T5 device’s file system
- write running configuration to the T5 device’s memory

The T5 switch is a means of providing cost-effective, high-speed, wall-to-wall coverage across a building. The T5 switch leverages the in-building telephone lines to extend Ethernet and Wireless LAN networks without additional expenditure on re-wiring. This setup is ideally suited for hotels, providing high-speed Wi-Fi coverage to guest rooms.

The entire setup consists of the DSL T5 switch, TW-510 Ethernet wallplates, and TW-511 wireless wallplate access points. Replace the phone jack plate in a room with the TW-511 delivers 802.11 a/b/g/n and extend wireless connectivity in that room and the neighboring rooms. These TW-511 wallplates (also referred to as the CPEs) are connected to the T5 switch over the DSL interface using a phone block.

The T5 switch is adopted and managed through a WiNG controller. The connection between the T5 and WiNG switches is over a WebSocket.

---

**NOTE:** For more information on other T5 CPE related commands, see `cpe`.

---

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

t5 [copy <SOURCE-FILE-NAME> <DEST-FILE-NAME> | delete <FILE-NAME> | rename <SOURCE-FILE-NAME> <DEST-FILE-NAME> | write memory] {on <T5-DEVICE-NAME>}

**Parameters**

- t5 [copy <SOURCE-FILE-NAME> <DEST-FILE-NAME> | delete <FILE-NAME> | rename <SOURCE-FILE-NAME> <DEST-FILE-NAME> | write memory] {on <T5-DEVICE-NAME>}

| **copy** <SOURCE-FILE-NAME> <DEST-FILE-NAME> | Copies file to an external server |
| --- |
| <SOURCE-FILE-NAME> – Specify the source file name. |
| <DEST-FILE-NAME> – Specify the destination file name. |
| **Note:** The content from the source file is copied to the destination file. |
| The source or destination files can be local or remote FTP or TFTP files. The source file also can be a pre-defined keyword. At least one of the files should be a local file. Use this command to copy the startup and/or running configurations to an external server. |

| **delete <FILE-NAME>** | Deletes files on the T5 device’s file system |
| --- |
| <FILE-NAME> – Specify the file name. The specified file is deleted. |

| **rename** <SOURCE-FILE-NAME> <DEST-FILE-NAME> | Renames a file on the T5 device’s file system |
| --- |
| <SOURCE-FILE-NAME> – Specify the source file name |
| <DEST-FILE-NAME> – Specify the new file name. The source file is renamed to the input provided here. |
| write memory | Writes running configuration to an adopted T5 device’s memory  
|             | • memory – Writes running configuration to the T5 device’s *non-volatile* (NV) memory. |
| **on** `<T5-DEVICE-NAME>` | Optional. Executes these operation on a specified T5 device  
|             | • `<T5-DEVICE-NAME>` – Specify the T5 device’s hostname. |

**Examples**

rfa7000-37FABE#t5 write memory on t5-ED5C2C
Success
rfa7000-37FABE#
3.1.52 telnet

Privileged Exec Mode Commands

Opens a Telnet session between two network devices

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
telnet <IP/HOSTNAME> {<TCP-PORT>} {<INTF-NAME>}

Parameters

- telnet <IP/HOSTNAME> {<TCP-PORT>} {<INTF-NAME>}

| <IP/HOSTNAME> | Configures the remote system’s IP (IPv4 or IPv6) address or hostname. The Telnet session will be established between the connecting system and the remote system.
| <TCP-PORT> | Optional. Specify the Transmission Control Protocol (TCP) port.
| <INTF-NAME> | Optional. Specify the interface name for the link local address.

Usage Guidelines

To exit the other device’s context, use the command relevant to that device.

Examples

nx9500-6C8809#telnet 192.168.13.22
Entering character mode
Escape character is ‘^[’.

AP7131 release 5.8.4.0-008D
ap7131-11B6C4 login: admin
Password:
ap7131-11B6C4>
### 3.1.53 terminal

*Privileged Exec Mode Commands*

Sets the number of characters per line, and the number of lines displayed within the terminal window.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
terminal [length|width] <0-512>
```

#### Parameters

- `terminal [length|width] <0-512>`

<table>
<thead>
<tr>
<th>length &lt;0-512&gt;</th>
<th>Sets the number of lines displayed on the terminal window</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;0-512&gt; – Specify a value from 0 - 512.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>width &lt;0-512&gt;</th>
<th>Sets the width or number of characters displayed on the terminal window</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;0-512&gt; – Specify a value from 0 - 512.</td>
</tr>
</tbody>
</table>

#### Examples

```bash
rfs7000-37FABE#terminal length 150
```

```bash
rfs7000-37FABE#terminal width 215
```

```bash
rfs7000-37FABE#show terminal
Terminal Type: xterm
Length: 150   Width: 215
```

#### Related Commands

- `no` - Resets the width of the terminal window or the number of lines displayed on a terminal window.
3.1.54 time-it

Privileged Exec Mode Commands

Verifies the time taken by a particular command between request and response

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6662, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

time-it <COMMAND>

Parameters

- time-it <COMMAND>

<table>
<thead>
<tr>
<th>time-it &lt;COMMAND&gt;</th>
<th>Verifies the time taken by a particular command to execute and provide a result</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;COMMAND&gt;</td>
<td>— Specify the command name.</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE#time-it config terminal
Enter configuration commands, one per line. End with CNTL/Z.
That took 0.00 seconds..
rfs7000-37FABE(config)#
```
3.1.55 traceroute

Traces the route to a defined destination

Use ‘--help’ or ‘-h’ to display a complete list of parameters for the traceroute command

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
traceroute <WORD>

Parameters
- traceroute <WORD>

Examples
nx9500-6C8809#traceroute 192.168.13.16
traceroute to 192.168.13.16 (192.168.13.16), 30 hops max, 46 byte packets
  1 192.168.13.16 (192.168.13.16) 0.479 ms 0.207 ms 0.199 ms
nx9500-6C8809#
3.1.56 traceroute6

Traces the route to a specified IPv6 destination

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
traceroute6 <WORD>

Parameters
- traceroute6 <WORD>

<table>
<thead>
<tr>
<th>traceroute6 &lt;WORD&gt;</th>
<th>Traces the route to a IPv6 address or hostname</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt;</td>
<td>— Specify the IPv6 address or hostname.</td>
</tr>
</tbody>
</table>

Examples
rfs4000-1B3596#traceroute6 2001:10:10:10:10:10:10:2
1 2001:10:10:10:10:10:10:10:2 (2001:10:10:10:10:10:10:10:2)  0.622 ms  0.497 ms  0.531 ms
rfs4000-1B3596#
3.1.57 upgrade

Privileged Exec Mode Commands

Upgrades a device’s software image

Supported in the following platforms:
• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
upgrade [<FILE>|<URL>]|dhcp-vendor-options

upgrade [<FILE>|<URL>]| {background|on <DEVICE-NAME>|on <RF-DOMAIN-NAME>}

upgrade dhcp-vendor-options {<DEVICE-NAME>|on <RF-DOMAIN-NAME>}

Parameters
• upgrade [<FILE>|<URL>] {background|on <DEVICE-NAME>|on <RF-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;FILE&gt;</td>
<td>Specify the target firmware image location in the following format:</td>
</tr>
<tr>
<td></td>
<td>cf:/path/file</td>
</tr>
<tr>
<td></td>
<td>usb1:/path/file</td>
</tr>
<tr>
<td></td>
<td>usb2:/path/file</td>
</tr>
<tr>
<td></td>
<td>usb&lt;n&gt;:/path/file</td>
</tr>
<tr>
<td>&lt;URL&gt;</td>
<td>Specify the target firmware image location. Use one of the following formats:</td>
</tr>
<tr>
<td>IPv4 URLs:</td>
<td>tftp://&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>ftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>sftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>http://&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>cf:/path/file</td>
</tr>
<tr>
<td></td>
<td>usb&lt;n&gt;:/path/file</td>
</tr>
<tr>
<td>IPv6 URLs:</td>
<td>tftp://&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>ftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>sftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>http://&lt;hostname</td>
</tr>
<tr>
<td>background</td>
<td>Optional. Performs upgrade in the background</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Upgrades the software image on a specified remote device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service</td>
</tr>
<tr>
<td></td>
<td>platform.</td>
</tr>
<tr>
<td>on &lt;RF-DOMAIN-NAME&gt;</td>
<td>Optional. Upgrades the software image on all devices within a specified RF</td>
</tr>
<tr>
<td></td>
<td>Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;RF-DOMAIN-NAME&gt; – Specify the name of the RF Domain.</td>
</tr>
</tbody>
</table>
### upgrade dhcp-vendor-options {<DEVICE-NAME>} {<DEVICE-NAME>}

<table>
<thead>
<tr>
<th>dhcp-vendor-options</th>
<th>Uses DHCP vendor options to upgrade device(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>{&lt;DEVICE-NAME&gt;} {&lt;DEVICE-NAME&gt;}</td>
<td>Optional. Uses DHCP vendor options to upgrade a specified device. Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td>• &lt;DEVICE-NAME&gt; – Optional. You can optionally specify multiple comma-separated device names/MAC addresses to upgrade.</td>
<td></td>
</tr>
</tbody>
</table>

### upgrade dhcp-vendor-options {on <RF-DOMAIN-NAME>} {containing <SUB-STRING>| exclude-controllers| exclude-rf-domain-managers| filter <DEVICE-TYPE>}

<table>
<thead>
<tr>
<th>dhcp-vendor-options</th>
<th>Uses DHCP vendor options to upgrade device(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;RF-DOMAIN-NAME&gt; {containing &lt;SUB-STRING&gt;}</td>
<td>Optional. Uses DHCP vendor options to upgrade all devices or specified device(s) within the RF Domain identified by the &lt;RF-DOMAIN-NAME&gt; keyword</td>
</tr>
<tr>
<td>• &lt;RF-DOMAIN-NAME&gt; – Specify the RF Domain name. After specifying the RF Domain, optionally use the filters provided to identify specific device(s) within the RF Domain. If none of the filters are used, all devices within the RF Domain are upgraded. These filters are:</td>
<td></td>
</tr>
<tr>
<td>• containing &lt;SUB-STRING&gt; – Optional. Upgrades all devices, within the specified RF Domain, containing a specified sub-string in their hostname</td>
<td></td>
</tr>
<tr>
<td>• &lt;SUB-STRING&gt; – Specify the sub-string to match.</td>
<td></td>
</tr>
<tr>
<td>• exclude-controllers – Optional. Upgrades all devices, within the specified RF Domain, excluding controllers. Since only a NOC controller is capable of adopting other controllers, use this option when executing the command on a NOC controller.</td>
<td></td>
</tr>
<tr>
<td>• exclude-rf-domain-manager – Optional. Upgrades all devices, within the specified RF Domain, excluding RF Domain managers. Use this option when executing the command on the NOC, Site controller, or RF Domain manager.</td>
<td></td>
</tr>
<tr>
<td>• filter &lt;DEVICE-TYPE&gt; – Optional. Executes the command on all devices, within the specified RF Domain, of a specified type</td>
<td></td>
</tr>
<tr>
<td>• &lt;DEVICE-TYPE&gt; – Specify the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX5500, NX55XX, NX75XX, NX9000, NX9600, VX9000. Upgrades all devices of the type specified here. For example, if AP6521 is the device-type specified, all AP6521s within the specified RF Domain are upgraded.</td>
<td></td>
</tr>
</tbody>
</table>

### Examples

```
root@rfs7000-37FABE#show boot
------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>IMAGE</th>
<th>BUILD DATE</th>
<th>INSTALL DATE</th>
<th>VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>04/28/2016 05:29:21</td>
<td>04/29/2016 00:33:28</td>
<td>5.8.4.0-008D</td>
</tr>
<tr>
<td>Secondary</td>
<td>04/22/2016 16:13:54</td>
<td>04/25/2016 00:08:47</td>
<td>5.8.4.0-007D</td>
</tr>
</tbody>
</table>
------------------------------------------------------------------------
```

**Current Boot**: Primary

**Next Boot**: Primary

**Software Fallback**: Enabled

rfs7000-37FABE
rfs7000-37FABE# upgrade ftp://anonymous:anonymous@192.168.13.10/LatestBuilds/W584/5.8.4.0-008D.img
Running from partition /dev/mtdblock7
Validating image file header
Making file system
Extracting files (this may take some time)
..................................................................................
.......................................................................................
..................................
Control C disabled
Version of firmware update file is 5.8.4.0-008D
Removing unneeded files from flash:/crashinfo directory
Removing unneeded files from flash:/var2/log directory
FPGA firmware version is already at version 1_26, no need to upgrade
PoE updates are handled via a patch file
Power Supervisor updates are handled via a patch file
Checking if boot sector needs to be upgraded
Boot Sector version 00008, image file bootsector ver 00008, no change required
Writing Kernel to /dev/mtd4
Writing BootOS to /dev/mtd15
Successful
rfs7000-37FABE#

rfs7000-37FABE# show boot
--------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>IMAGE</th>
<th>BUILD DATE</th>
<th>INSTALL DATE</th>
<th>VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>04/28/2016</td>
<td>00:33:28</td>
<td>5.8.4.0-008D</td>
</tr>
<tr>
<td>Secondary</td>
<td>04/22/2016</td>
<td>00:08:47</td>
<td>5.8.4.0-007D</td>
</tr>
</tbody>
</table>
--------------------------------------------------------------------------------
Current Boot : Primary
Next Boot     : Primary
Software Fallback : Enabled

After upgrading, the device has to be reloaded to boot using the new image.

The following example displays the devices adopted by the nx7500-7F3609 service platform:

nx7500-7F3609# show adoption status
---------------------------------------------------------------------------------------
| DEVICE-NAME     | VERSION       | CFG-STAT         | MSGS ADOPTED-BY | LAST-ADOPTION | UPTIME      |
---------------------------------------------------------------------------------------
| rfs6000-18072B  | 5.8.4.0-008D configured | No nx7500-7F3609 | 0 days 00:35:33 | 0 days 00:41:37 |
| rfs7000-6DCBB3  | 5.8.4.0-006D version-mismatch | No nx7500-7F3609 | 0 days 00:00:00 | 0 days 00:04:45 |
---------------------------------------------------------------------------------------
Total number of devices displayed: 2

nx7500-7F3609#

In the following example, only one device (rfs7000-6DCBB3) is being upgraded. The image file is located on a TFTP server. Path and file name are provided.

nx7500-7F3609# upgrade tftp://192.168.0.50/RFS7000-5.8.4.0-008D.img rfs7000-6DCBB3
--------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>DEVICE</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs7000-6DCBB3</td>
<td>Success</td>
<td>None</td>
</tr>
</tbody>
</table>
--------------------------------------------------------------------------------
nx7500-7F3609# show upgrade-status
Last Image Upgrade Status : Successful
Last Image Upgrade Time : 2016-04-13 05:27:40
nx7500-7F3609#
The following example shows the upgrade status:

nx7500-7F3609#show upgrade detail
Last Image Upgrade Status : Successful
Last Image Upgrade Time   : 2016-04-13 05:27:40
-----------------------------------------------
Running from partition /dev/sda7
var2 is 2 percent full
/tmp is 2 percent full
Free Memory 15258044 kB
FWU invoked via Linux shell
Validating image file header
Removing other partition
Making file system
Extracting files (this may take some time).
Control C disabled
Version of firmware update file is 5.8.4.0-008D
Creating LILO files
Running LILO
Successful

nx7500-7F3609#

nx7500-7F3609#show upgrade on rfs7000-6DCBB3
Last Image Upgrade Status : Successful
Last Image Upgrade Time   : 2016-04-13 05:27:40
nx7500-7F3609#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a patch installed on a specified device</td>
</tr>
</tbody>
</table>
3.1.58 upgrade-abort

Privileged Exec Mode Commands

Aborts an ongoing software image upgrade

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

upgrade-abort {on <DEVICE-OR-DOMAIN-NAME>}

Parameters

- upgrade-abort {on <DEVICE-OR-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>upgrade-abort</th>
<th>Aborts an ongoing software image upgrade</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Aborts an ongoing software image upgrade on a specified device or domain</td>
</tr>
<tr>
<td>&lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58#upgrade ftp://anonymous:anonymous@192.168.13.10/LatestBuilds/W584/RFS4000.img
Running from partition /dev/mtdblock6
Validating image file header
Making file system
Extracting files (this may take some time).................

rfs7000-37FABE#upgrade-abort on rfs4000-229D58

rfs4000-229D58#upgrade ftp://anonymous:anonymous@192.168.13.10/LatestBuilds/W584/RFS4000.img
Running from partition /dev/mtdblock6
Validating image file header
Making file system
Extracting files (this may take some time).................

Update error: Aborted
rfs4000-229D58#
### 3.1.59 watch

- **Privileged Exec Mode Commands**

  Repeats a specified CLI command at periodic intervals

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
watch <1-3600> <LINE>
```

**Parameters**

- `watch <1-3600> <LINE>`

<table>
<thead>
<tr>
<th><strong>watch &lt;1-3600&gt;</strong></th>
<th>Repeats a CLI command at a specified interval</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&lt;1-3600&gt;</strong></td>
<td>Select an interval from 1 - 3600 seconds. Pressing CTRL-Z halts execution of the command.</td>
</tr>
<tr>
<td><strong>&lt;LINE&gt;</strong></td>
<td>Specify the CLI command name.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE#watch 1 show clock
rfs7000-37FABE#
```
3.1.60 exit

Privileged Exec Mode Commands

Ends the current CLI session and closes the session window

For more information, see exit.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
exit

Parameters
None

Examples
rfs7000-37FABE#exit
3.1.61 smart-cache

Privileged Exec Mode Commands

Pre-fetches cached content from the specified list of URLs

Smart caching is a licensed service available on the NX45XX and NX65XX series service platforms. It allows the temporary storage of frequently accessed Web content (Web pages, graphics, audio and video files, etc.) on network infrastructure devices. When this content is requested, it is retrieved from a local content cache and not from the origin server. For more information on enabling content caching, see smart-cache-policy.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

smart-cache pre-fetch-immediate <URL-LIST-NAME>

Parameters

- smart-cache pre-fetch-immediate <URL-LIST-NAME>

<table>
<thead>
<tr>
<th>smart-cache</th>
<th>Pre-fetches content from the specified list of URLs</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-fetch-immediate &lt;URL-LIST-NAME&gt;</td>
<td>Provide the URL list names (should be existing and configured). For more information on configuring URL lists, see url-list.</td>
</tr>
</tbody>
</table>

Examples

nx4500-5CFAB2B#smart-cache pre-fetch-immediate ?
  URL-LIST URL List to be Pre Fetched

nx4500-5CFAB2B#
3.1.62 virtual-machine

Privileged Exec Mode Commands

Installs, configures, and monitors the status of third-party virtual machines (VMs)

In addition to the WiNG VMs, the NX45XX, NX65XX, NX9500, and NX9510 series service platforms support the installation and administration of third-party VMs. However, the third-party VMs supported by these devices varies. The third-party VMs supported on NX45XX and NX65XX are:

- TEAM-URC
- TEAM-RLS
- TEAM-VoWLAN

The VM supported on NX9500 and NX9510 is:

- ADSP

Use the virtual-machine command to install the third-party VMs, and configure parameters, such as install media type and location, number of Virtual Central Processing Units (VCPUS), VM memory, VM disk, number of Virtual Network Interfaces (VIFs), and Virtual Networking Computing (VNC) port.

Installing third-party VMs saves on hardware cost and provides a unified VM management interface.

This section is organized into the following sub-sections:

- Syntax NX45XX, NX65XX
- Syntax NX9500 and NX9510

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax NX45XX, NX65XX

virtual-machine [assign-usb-ports|console|export|install|restart|set|start|stop
uninstall]

virtual-machine assign-usb-ports team-vowlan {on <DEVICE-NAME>}

virtual-machine console [ [<VM-NAME>|team-urc|team-rls|team-vowlan]

virtual-machine export <VM-NAME> [ [<FILE>|<URL> ] {on <DEVICE-NAME>}

virtual-machine install [ <VM-NAME>|team-urc|team-rls|team-vowlan]

virtual-machine install <VM-NAME> type [disk|iso disk-size <SIZE>|vm-archive]

install-media [ <FILE>|<URL>|<USB> ] {autostart|memory|on|vcpus|vif-count|vnc}

virtual-machine install [ team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine restart [ <VM-NAME>|hard|team-urc|team-rls|team-vowlan]

virtual-machine restart [ <VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine restart hard [ <VM-NAME>|team-urc|team-rls|team-vowlan]

{on <DEVICE-NAME>}

virtual-machine set [autostart|memory|vcpus|vif-count|vif-mac|vif-to-vmif|vnc]

virtual-machine set [autostart|ignore|start]memory <512-8192> vcpus <1-4>

vif-count <0-2> vif-mac <VIF-INDEX> [ <MAC-INDEX>|<MAC>|vif-to-vmif <VIF-INDEX>

VMIF-INDEX>|vnc [disable|enable]] [ <VM-NAME>|team-urc|team-rls|team-vowlan]

{on <DEVICE-NAME>}

virtual-machine start [ <VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop [ <VM-NAME>|hard|team-urc|team-rls|team-vowlan]

virtual-machine stop [ <VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

virtual-machine stop hard [ <VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

PRIVILEGED EXEC MODE COMMANDS 3-125
### virtual-machine uninstall [〈VM-NAME〉|〈team-urc〉|〈team-rls〉|〈team-vowlan〉] {on 〈DEVICE-NAME〉}

**Parameters** NX45XX, NX65XX

- **virtual-machine assign-usb-ports team-vowlan {on 〈DEVICE-NAME〉}**

Assigns USB ports to TEAM-VoWLAN

- **team-vowlan** – Assigns USB ports to TEAM-VoWLAN on a specified device
- **on 〈DEVICE-NAME〉** – Optional. Specify the device name.

Use the `no > virtual-machine > assign-usb-ports` command to reassign the port to WiNG.

**Note:** TEAM-RLS VM cannot be installed when USB ports are assigned to TEAM-VoWLAN.

### virtual-machine console [〈VM-NAME〉|〈team-urc〉|〈team-rls〉|〈team-vowlan〉]

Connects to the VM’s console, based on the parameters passed. Select one of the following console options:

- **〈VM-NAME〉** – Connects to the console of the VM identified by the 〈VM-NAME〉 keyword. Specify the VM name.
- **team-urc** – Connects to the VM TEAM Unified Retail Communication’s (URC) (IP-PBX) console
- **team-rls** – Connects to the VM TEAM Radio Link Service (RLS) server’s console
- **team-vowlan** – Connects to the VM TEAM-VoWLAN’s (Voice over WLAN) console

### virtual-machine export 〈VM-NAME〉 [〈FILE〉|〈URL〉] {on 〈DEVICE-NAME〉}

Exports an existing VM image and settings. Use this command to export the VM to another NX45XX or NX65XX device in the same domain.

- **〈VM-NAME〉** – Specify the VM name.
- **〈FILE〉** – Specify the location and name of the source file (VM image). The VM image is retrieved and exported from the specified location.
- **〈URL〉** – Specify the destination location. This is the location to which the VM image is copied. Use one of the following formats to provide the destination path:
  - `ftp://<hostname|IP>[<port>]/path/file`
  - `http://<hostname|IP>[<port>]/path/file`
  - `sftp://<user>:<passwd>@<hostname|IP>[<port>]/path/file`
  - `http://<hostname|IP>[<port>]/path/file`
- **on 〈DEVICE-NAME〉** – Optional. Executes the command on a specified device or devices
- **〈DEVICE-NAME〉** – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

The VM should be in a stop state during the export process. If the destination is a device, the image is copied to a predefined location (VM archive).
### PRIVILEGED EXEC MODE COMMANDS

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| **virtual-machine install** `<VM-NAME>` type [disk|iso disk-size `<SIZE>`|vm-archive] install-media `<FILE>|<URL>|<USB>` {autostart|memory|on|vcpus|vif-count|vnc} | Installs the VM. The install command internally creates a VM template, consisting of the specified parameters, and starts the installation process.  
- `<VM-NAME>` – Specify the VM name.  
- type – Specify the install-media (image) type. The options are:  
  - disk – Specifies the install media type as pre-installed OS disk image (located in the flash memory)  
  - iso disk-size `<SIZE>` – Specifies the install media type as ISO file. This is a single file, which contains the OS bootable install media.  
  - disk-size `<SIZE>` – If the install media type is ISO, specify the disk size in GB.  
  - vm-archive – Specifies the install media type as VM archive. The VM archive file is a tar.gz file consisting of a pre-installed OS disk image and an associated configuration file. The configuration is a standard libvirt VM template consisting of VM specific information.  

**Note:** After specifying the install media type, specify the location of the image. The image can be located in any of the following supported locations: FLASH, USB, or a remote location, such as http, ftp, sftp, tftp.

| **install-media** `<FILE>|<URL>|<USB>` {autostart|memory|on|vcpus|vif-count|vnc} | Specifies the install media location  
- `<FILE>` – Specifies the install-media file is located on flash, for example flash:/cache  
- `<URL>` – Specifies the install-media file is located on a remote URL. Provide the URL using one of the following formats:  
  - tftp://<hostname|IP>[:port]/path/file  
  - ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file  
  - sftp://<user>:<passwd>@<hostname|IP>[:port]/path/file  
  - http://<hostname|IP>[:port]/path/file  
- `<USB>` – Specifies the install-media file is located on a USB. Provide the USB path and file name using the following format:  
  - usb<n>:/path/file  

After specifying the image location, you may provide the following information:  
- autostart – Optional. Specifies whether to autostart the VM on system reboot  
- ignore – Enables autostart on each system boot/reboot  
- start – Disables autostart (default setting)  
- memory – Optional. Defines the VM memory size  
  - `<512-8192>` – Specify the VM memory from 512 - 8192 MB. The default is 2048 MB.  
- on – Optional. Executes the command on a specified device  
  - `<DEVICE-NAME>` – Specify the service platform name.  
- vcpus – Optional. Specifies the number of VCPUS for this VM  
  - `<1-4>` – Specify the number of VCPUS from 1 - 4. The default setting is 4.  
- vif-count – Optional. Configures or resets the VIF number for this VM  
  - `<0-2>` – Specify the VIF number from 0 - 2. The default setting is 1. If assigning a virtual network interface for the VM, optionally specify the following parameters:  
    - vif-mac – Sets the MAC index for the virtual interfaces 1 & 2.  

Contd...
### virtual-machine install

**Syntax:**
```
virtual-machine install [team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}
```

**Description:**
Installs the VM. The install command internally creates a VM template, consisting of the specified parameters, and starts the installation process. Select one of the following options:
- **team-urc** – Installs the VM TEAM-URC image
- **team-rls** – Installs the VM TEAM-RLS image
- **team-vowlan** – Installs the VM TEAM-VoWLAN image

The following keywords are common to all of the above parameters:
- **on <DEVICE-NAME>** – Optional. Executes the command on a specified device or devices
- **<DEVICE-NAME>** – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

### virtual-machine restart

**Syntax:**
```
virtual-machine restart [<VM-NAME>|hard|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}
```

**Description:**
Restarts the VM
- **<VM-NAME>** – Restarts the VM identified by the **<VM-NAME>** keyword
- **team-urc** – Restarts the VM TEAM-URC
- **team-rls** – Restarts the VM TEAM-RLS
- **team-vowlan** – Restarts the VM TEAM-VoWLAN

The following keywords are common to all of the above parameters:
- **on <DEVICE-NAME>** – Optional. Executes the command on a specified device or devices
- **<DEVICE-NAME>** – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

The option 'hard' forces the specified VM to restart.

### Additional Options

- **vif-to-vmif** – Maps the virtual interface (1 or 2) to the selected VMIF interface. Specify the VMIF interface index from 1 - 8. VMIFs are layer 2 interfaces on the WiNG bridge. Each custom VM can have up to a maximum of 2 virtual Ethernet interfaces. By default, these interfaces are internally connected to the Dataplane bridge through VMIF1, which is an untagged port with access VLAN 1.
- **vnc** – Enables VNC on the virtual interfaces 1 & 2
- **vnc** – Optional. Disables/enables VNC port. When enabled, provides remote access to VGA through the noVNC client.
- **disable** – Disables VNC
- **enable** – Enables VNC (default setting)
vif-count <0-2>|vif-mac <VIF-INDEX> [<MAC-INDEX>|<MAC>]|vif-to-vmif <VIF-INDEX> <VMIF-INDEX>|vnc [disable|enable] [<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

Configures the VM settings
- autostart – Specifies whether to autostart the VM on system reboot
  - ignore – Enables autostart on each system reboot
  - start – Disables autostart
- memory – Defines the VM memory size
  - <512-8192> – Specify the VM memory from 512 - 8192 MB. The default is 1024 MB.
- vcpus – Specifies the number of VCPUs for this VM
  - <1-4> – Specify the number of VCPUs from 1 - 4.
- vif-count – Configures or resets the VM’s VIFs
  - <0-2> – Specify the Virtual Interface (VIF) number from 0 - 2.
- vif-mac – Configures the MAC address of the selected virtual network interface
  - <VIF-INDEX> – Select the VIF Index from 1 - 2.
  - <MAC-INDEX> – Specify the MAC index for the selected VIF from 1 - 8.
  - <MAC> – Specify the customized MAC address for the selected VIF in the AA-BB-CC-DD-EE-FF format.

Each VM has a maximum of two network interfaces ( indexed 1 and 2, referred to as VIF). By default, each VIF is automatically assigned a MAC from the range allocated for that device. However, you can use the ‘set’ keyword to specify the MAC from within the allocated range. Each of these VIFs are mapped to a layer 2 port in the dataplane (referred to as VMIF). These VMIFs are standard l2 ports on the DP bridge, supporting all VLAN and ACL commands. The WiNG software supports up to a maximum of 8 VMIFs. By default, a VM’s interface is always mapped to VMIF1. You can map a VIF to any of the 8 VMIFs. Use the vif-to-vmif command to map a VIF to a VMIF on the DP bridge.
- vif-to-vmif – Maps the virtual interface (1 or 2) to the selected VMIF interface.
  - Specify the VMIF interface index from 1 - 8.
  - <VIF-INDEX> – Selects the VIF index from 1 - 2.
  - <VMIF-INDEX> – Specify the VMIF index from 1 - 8.

WiNG provides a dataplane bridge for external network connectivity for VMs. VM Interfaces define which IP address is associated with each VLAN ID the service platform is connected to and enables remote service platform administration. Each custom VM can have up to a maximum of two VM interfaces. Each VM interface can be mapped to one of the eight VMIF ports for NX4500 and NX6500 service platforms and twelve ports for NX9500 on the dataplane bridge. This mapping determines the destination for service platform routing.

By default, VM interfaces are internally connected to the dataplane bridge via VMIF1. VMIF1, by default, is an untagged port providing access to VLAN 1 to support the capability to connect the VM interfaces to any of the VMIF ports. This provides the flexibility to move a VM interface onto different VLANs as well as configure specific firewall and QoS rules.
- vnc – Disables/enables VNC port option for an existing VM. When enabled, provides remote access to VGA through the noVNC client.
  - disable – Disables VNC port
  - enable – Enables VNC port
After configuring the VM settings, identify the VM to apply the settings.

- `<VM-NAME>` – Applies these settings to the VM identified by the `<VM-NAME>` keyword. Specify the VM name.
- `team-urc` – Applies these settings to the VM TEAM-URC
- `team-rls` – Applies these settings to the VM TEAM-RLS
- `team-vowlan` – Applies these settings to the VM TEAM-VoWLAN
  - `on <DEVICE-NAME>` – Optional. Executes the command on a specified device or devices
  - `<DEVICE-NAME>` – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

```
virtual-machine start [<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}
```

Starts the VM, based on the parameters passed. Select one of the following options:

- `<VM-NAME>` – Starts the VM identified by the `<VM-NAME>` keyword. Specify the VM name.
- `team-urc` – Starts the VM TEAM-URC
- `team-rls` – Starts the VM TEAM-RLS
- `team-vowlan` – Starts the VM TEAM-VoWLAN

The following keywords are common to all of the above parameters:

- `on <DEVICE-NAME>` – Optional. Executes the command on a specified device or devices
- `<DEVICE-NAME>` – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

```
virtual-machine stop [<VM-NAME>|hard|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}
```

Stops the VM, based on the parameters passed. Select one of the following options:

- `<VM-NAME>` – Stops the VM identified by the `<VM-NAME>` keyword. Specify the VM name.
- `team-urc` – Stops the VM TEAM-URC
- `team-rls` – Stops the VM TEAM-RLS
- `team-vowlan` – Stops the VM TEAM-VoWLAN

The following keywords are common to all of the above parameters:

- `on <DEVICE-NAME>` – Optional. Executes the command on a specified device or devices
- `<DEVICE-NAME>` – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

The option `hard` forces the selected VM to shutdown.
virtual-machine uninstall [<VM-NAME>|team-urc|team-rls|team-vowlan] {on <DEVICE-NAME>}

Uninstalls the specified VM
- `<VM-NAME>` – Uninstalls the VM identified by the `<VM-NAME>` keyword. Specify the VM name.
- `team-urc` – Uninstalls the VM TEAM-URC
- `team-rls` – Uninstalls the VM TEAM-RLS
- `team-vowlan` – Uninstalls the VM TEAM-VoWLAN

The following keywords are common to all of the above parameters:
- `{on <DEVICE-NAME>}` – Optional. Executes the command on a specified device or devices
  - `<DEVICE-NAME>` – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

**Note**: This command releases the VM's resources, such as memory, VCPUS, VNC port, disk space, and removes the RF Domain reference from the system.

**Syntax NX9500 and NX9510**

- `virtual-machine console adsp`
- `virtual-machine install [adsp] {on <DEVICE-NAME>}`
- `virtual-machine restart [adsp] {on <DEVICE-NAME>}`
- `virtual-machine set disk-size <100-500> adsp {on <DEVICE-NAME>}`
- `virtual-machine set wing-memory <12288-32739>`
- `virtual-machine [start|stop] adsp {on <DEVICE-NAME>}`
- `virtual-machine uninstall adsp {on <DEVICE-NAME>}`

**Note**: On an NX95XX, you can use the install, start, stop, restart, and set commands to manage a third-party VM running on a NX45XX and NX65XX. You can also configure a third-party VM’s settings through a NX95XX series service platform.

**Parameters NX9500 and NX9510**

- `virtual-machine console adsp`

  Connects to the *Air-Defense Services Platform* (ADSP) VM’s management console. When ADSP is running on the NX9500 and NX9510 model service platforms, WiNG communicates with ADSP using a *single sign-on* (SSO) authentication mechanism. Once the user is logged in, WiNG gains access to ADSP without being prompted to login again at ADSP. However, the WiNG and ADSP databases are not synchronized. ADSP has its own user database, stored locally within its VM, which is accessed whenever a user logs directly into ADSP.

  WiNG and ADSP must be consistent in the manner events are reported up through a network hierarchy to ensure optimal interoperability and event reporting. To provide such consistency, WiNG has added support for an ADSP-like hierarchical tree. The tree resides within WiNG, and ADSP reads it from WiNG and displays the network hierarchy in its own ADSP interface. The hierarchical tree can also be used to launch ADSP modules (like Spectrum Analyzer) directly from WiNG. For more information on configuring WiNG tree-node structure, see `tree-node`. 
virtual-machine install adsp {on <DEVICE-NAME>}

Installs the ADSPVM

- on <DEVICE-NAME> – Optional. Executes the command on a specified device or devices
- <DEVICE-NAME> – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

Before installing the ADSP VM, execute the upgrade command, giving the path and file name of the ADSP firmware image. This extracts the image on to the device (NX9500 or NX9510) on which the command has been executed. On successful completion of this process, execute the reload command to reboot the device. Once the device has been successfully rebooted, execute the `virtual-machine > install > adsp` command.

For example:

```
#upgrade tftp://20.1.1.60/adsp-9.1.1Jan 08 15:12:41 2016:
%DAEMON-6-INFO: lighttpd[2405]: 127.0.0.1 127.0.0.1:443 - "POST /mapi.fcgi HTTP/1.1" 200 192 "-" "-
-03-5.8.4.0-024D.img
Jan 08 15:12:51 2016: nx9500-6C874D : %DIAG-6-NEW_LED_STATE: LED state message FIRMWARE_UPGRADE_STARTED
from module led_msg
Running from partition /dev/sda8
Validating image file header
Extracting files (this may take some time).....Jan 08
15:12:53 2016: %DAEMON-6-INFO: lighttpd[2405]: 127.0.0.1
127.0.0.1:443 - "POST /mapi.fcgi HTTP/1.1" 200 923 "-" "-
```

virtual-machine restart adsp {on <DEVICE-NAME>}

Restarts the ADSP VM

- on <DEVICE-NAME> – Optional. Executes the command on a specified device or devices
- <DEVICE-NAME> – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

virtual-machine set disk-size <100-500> adsp {on <DEVICE-NAME>}

Sets the ADSP VM's disk size (in GB)

- <100-500> – Specify a value from 100 - 500 GB.
- adsp – Sets the VM as ADSP
  - on <DEVICE-NAME> – Optional. Executes the command on a specified device or devices
    - <DEVICE-NAME> – Specify the service platform name. In case of multiple devices, list the device names separated by commas.

Stop the ADSP VM before executing this command.

virtual-machine set memory <512-8192> adsp {on <DEVICE-NAME>}

Modifies the ADSP VM's memory

- <512-8192> – Specify a value from 512 - 8192 MB.
- adsp – Sets the VM as ADSP
  - on <DEVICE-NAME> – Optional. Executes the command on a specified device or devices
    - <DEVICE-NAME> – Specify the service platform name. In case of multiple devices, list the device names separated by commas.
### virtual-machine set wing-memory `<12288-32739>`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>virtual-machine set wing-memory </code>&lt;12288-32739&gt;`</td>
<td>Specifies the WiNG memory size in MB. This command is applicable only to the NX9500 and NX9510 service platforms. Use the <code>show &gt; virtual-machine-configuration</code> command to view the configured memory allocation. Use the <code>show &gt; virtual-machine-statistics</code> to view the current allocated memory allocation.</td>
</tr>
<tr>
<td>&lt;12288-32739&gt; – Specify a value from 12288 - 32739 MB. The default is 18432 MB.</td>
<td>The new memory setting takes effect only after the next boot.</td>
</tr>
</tbody>
</table>

### virtual-machine [start|stop] adsp {on `<DEVICE-NAME>`}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`virtual-machine [start</td>
<td>stop] adsp {on <code>&lt;DEVICE-NAME&gt;</code>}`</td>
</tr>
<tr>
<td>start – Starts the ADSP VM. Use this command to boot a shut down VM (in a stop state).</td>
<td></td>
</tr>
<tr>
<td>stop – Stops a running ADSP VM. Use this command to shut down a running VM.</td>
<td></td>
</tr>
<tr>
<td>on <code>&lt;DEVICE-NAME&gt;</code> – Optional. Executes the start/stop command on a specified device or devices</td>
<td></td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt; – Specify the service platform name. In case of multiple devices, list the device names separated by commas.</td>
<td></td>
</tr>
</tbody>
</table>

### virtual-machine uninstall adsp {on `<DEVICE-NAME>`}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>virtual-machine uninstall adsp {on </code>&lt;DEVICE-NAME&gt;<code>}</code></td>
<td>Uninstalls the ADSP VM.</td>
</tr>
<tr>
<td>adsp – Sets the VM as ADSP.</td>
<td></td>
</tr>
<tr>
<td>on <code>&lt;DEVICE-NAME&gt;</code> – Optional. Executes the command on a specified device or devices</td>
<td></td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt; – Specify the service platform name. In case of multiple devices, list the device names separated by commas.</td>
<td></td>
</tr>
</tbody>
</table>

### Examples

The following examples show the VM installation process:

**Installation media: USB**

```
<DEVICE>#virtual-machine install `<VM-NAME>` type iso disk-size 8 install-media usb1://vms/win7.iso autostart start memory 512 vcpus 3 vif-count 2 vnc enable
```

**Installation media: pre-installed disk image**

```
<DEVICE> virtual-machine install `<VM-NAME>` type disk install-media flash://vms/win7_disk.img autostart start memory 512 vcpus 3 vif-count 2 vnc-enable on `<DEVICE-NAME>`
```

In the preceding example, the command is executed on the device identified by the `<DEVICE-NAME>` keyword. In such a scenario, the disk-size is ignored if specified. The VM has the install media as first boot device.

**Installation media: VM archive**

```
<DEVICE>#virtual-machine install type vm-archive install-media flash://vms/ `<VM-NAME>` vcpus 3
```

In the preceding example, the default configuration attached with the VM archive overrides any parameters specified.

**Exporting an installed VM:**

```
<DEVICE>#virtual-machine export `<VM-NAME>` `<URL>` on `<DEVICE-NAME>`
```
In the preceding example, the command copies the VM archive on to the URL (VM should be in stop state).

nx4500-5CFA2B# virtual-machine install team-urc
Virtual Machine install team-urc command successfully sent.
nx4500-5CFA2B#

| NOTE: Use the show > virtual-machine > [configuration|debugging|export|statistics] command to view installed VM details. |

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Reassigns USB port to WiNG</td>
</tr>
</tbody>
</table>
### 3.1.63 raid

**Privileged Exec Mode Commands**

Enables *Redundant Array of Independent Disks* (RAID) management

RAID is a group of one or more independent, physical drives, referred to as an array or drive group. These physically independent drives are linked together and appear as a single storage unit or multiple virtual drives. Replacing a single, large drive system with an array, improves performance (input and output processes are faster) and increases fault tolerance within the data storage system.

In an array, the drives can be organized in different ways, resulting in different RAID types. Each RAID type is identified by a number, which determines the RAID level. The common RAID levels are 0, 00, 1, 5, 6, 50 and 60. The WiNG MegaRAID implementation supports RAID-1, which provides data mirroring, but does not support data parity. RAID-1 consists of a two-drive array, where the data is simultaneously written on both drives, ensuring total data redundancy. In case of a drive failure the information on the other drive is used to rebuild the failed drive.

An array is said to be degraded when one of its drives has failed. A degraded array continues to function and can be rebooted using the one remaining functional drive. When a drive fails, the chassis sounds an alarm (if enabled), and the CLI prompt changes to "RAID degraded". The failed drive is automatically replaced with a hot spare (provided a spare is installed). The spare is used to re-build the array.

Use this command to:

- Verify the current array status
- Start and monitor array consistency checks
- Retrieve date and time of the last consistency check
- Shut down drives before physically removing them
- Install new drives
- Assign drives as hot spares
- Identify a degraded drive
- Deactivate an alarm (triggered when a drive is removed from the array)

Supported in the following platforms:

- Service Platforms — NX7530, NX9500

**NOTE:** RAID controller drive arrays are available within NX7530 and NX9000 series service platforms (NX9000, NX9500 and NX9510 models) only. However, they can be administrated on behalf of a NX9000 profile by a different model service platform or controller. The NX9500 service platform includes a single Intel MegaRAID controller, configured to provide a single virtual drive. This virtual drive is of the RAID-1 type, and has a maximum of two physical drives. In addition to these two drives, there are three hot spares, which are used in case of a primary drive failure.

**Syntax**

```
raid [check|install|locate|remove|silence|spare]
raid [check|silence]
raid [install|locate|remove|spare] drive <0-4>
```

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>check</td>
<td>Starts a consistency check on the RAID array. Use the <code>show &gt; raid</code> command to view consistency check status. A consistency check verifies the data stored in the array. When regularly executed, it helps protect against data corruption, and ensures data redundancy. Consistency checks also warn of potential disk failures.</td>
</tr>
</tbody>
</table>
silence  Deactivates an alarm

**Note:** When enabled, an audible alarm is triggered when a drive in the array fails. The _silence_ command deactivates the alarm (sound).

**Note:** To enable RAID alarm, in the device configuration mode, use the _raid > alarm > enable_ command. A NX9500 profile can also have the RAID alarm feature activated. For more information on the enabling RAID alarm, see _raid_.

- raid [install|locate|remove|spare] drive <0-4>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>install &lt;0-4&gt;</td>
<td>Includes a new drive, inserted in one of the available slots, in the array. Specify the drive number.</td>
<td><strong>Note:</strong> Drives 0 and 1 are the array drives. Drives 2, 3, and 4 are the hot spare drives. You can include the new drive in a degraded array, or enable it as a hot spare. <strong>Note:</strong> If the array is in a degraded state, the re-build process is triggered and the new drive is used to repair the degraded array.</td>
</tr>
<tr>
<td>locate &lt;0-4&gt;</td>
<td>Enables LEDs to blink on a specified drive. Specify the drive number.</td>
<td><strong>Note:</strong> Blinking LEDs enable you correctly locate a drive.</td>
</tr>
<tr>
<td>remove &lt;0-4&gt;</td>
<td>Removes (shuts downs) a disk from the array, before it is physically removed from its slot. Specify the drive number containing the disk.</td>
<td><strong>Note:</strong> Use this command to also remove a hot spare.</td>
</tr>
<tr>
<td>spare &lt;0-4&gt;</td>
<td>Converts an unused drive into a hot spare. Specify the drive number.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C874D# raid install drive 0
Error: Input Error: Drive 0 is already member of array, can't be added

nx9500-6C874D#
CHAPTER 4
GLOBAL CONFIGURATION COMMANDS

This chapter summarizes the global-configuration commands in the CLI command structure.
The term global indicates characteristics or features effecting the system as a whole. Use the Global Configuration Mode to configure the system globally, or enter specific configuration modes to configure specific elements (such as interfaces or protocols). Use the configure terminal command (under PRIV EXEC) to enter the global configuration mode.

The following example describes the process of entering the global configuration mode from the PRIV EXEC mode:

<DEVICE>#configure terminal
<DEVICE>(config)#

NOTE: The system prompt changes to indicate you are now in the global configuration mode. The prompt consists of the device host name followed by (config) and a pound sign (#).

Commands entered in the global configuration mode update the running configuration file as soon as they are entered. However, these changes are not saved in the startup configuration file until a commit write memory command is issued.

<DEVICE>(config)#?
Global configuration commands:
  aaa-policy Configure a authentication/accounting/authorization policy
  aaa-tacacs-policy Configure an authentication/accounting/authorization TACACS policy
  alias Alias
  ap621 AP621 access point
  ap622 AP622 access point
  ap650 AP650 access point
  ap6511 AP6511 access point
  ap6521 AP6521 access point
  ap6522 AP6522 access point
  ap6532 AP6532 access point
  ap6562 AP6562 access point
  ap71xx AP71XX access point
  ap7502 AP7502 access point
  ap7522 AP7522 access point
  ap7532 AP7532 access point
  ap7562 AP7562 access point
  ap81xx AP81XX access point
  ap82xx AP82XX access point
ap8432  AP8432 access point
ap8533  AP8533 access point
application  Configure an application
application-policy  Configure an application policy
association-acl-policy  Configure an association acl policy
auto-provisioning-policy  Configure an auto-provisioning policy
bgp  BGP Configuration
Bonjour-gw-discovery-policy  Bonjour Gateway discovery policy
Bonjour-gw-forwarding-policy  Bonjour Gateway forwarding policy
Bonjour-gw-query-forwarding-policy  Bonjour Gateway Query forwarding policy
captive-portal  Configure a captive portal
clear  Clear
customer-identity  Client identity (DHCP Device Fingerprinting)
customer-identity-group  Client identity group (DHCP Fingerprint Database)
clonedev  Clone configuration object
cryptocmp-policy  CMP policy
customize  Customize the output of summary cli commands
database-client-policy  Configure database client policy
database-policy  Configure database policy
device  Configuration on multiple devices
device-categorization  Configure a device categorization object
dhcp-server-policy  DHCP server policy
dhcpv6-server-policy  DHCPv6 server related configuration
dns-whitelist  Configure a whitelist
event-system-policy  Configure a event system policy
ex3500  EX3500 device
ex3500-management-policy  Configure a ex3500 management policy
ex3500-gos-class-map-policy  Configure a ex3500 gos class-map policy
ex3500-gos-policy-map  Configure a ex3500 gos-policy-map
ex3524  EX3524 wireless controller
ex3548  EX3548 wireless controller
firewall-policy  Configure firewall policy
guest-management  Configure a guest management policy
help  Description of the interactive help system
host  Enter the configuration context of a device by specifying its hostname
igmp-snoop-policy  Create igmp snoop policy
inline-password-encryption  Store encryption key in the startup configuration file
ip  Internet Protocol (IP)
ipv6  Internet Protocol version 6 (IPv6)
ipv6-router-advertisement-policy  IPv6 Router Advertisement related configuration
l2tpv3  L2tpv3 tunnel protocol
mac  MAC configuration
management-policy  Configure a management policy
meshpoint  Create a new MESHPOINT or enter MESHPOINT configuration context for one or more MESHPOINTS
meshpoint-qos-policy  Configure a meshpoint quality-of-service policy
mint-policy  Configure the global mint policy
nac-list  Configure a network access control list
no  .
nsight-policy  Configure a Nsight policy
nx45xx  NX45XX integrated services platform
nx5500  NX5500 wireless controller
nx65xx  NX65XX integrated services platform
nx75xx  NX75XX wireless controller
nx9000  NX9000 wireless controller
passpoint-policy  Configure a passpoint policy
password-encryption  Encrypt passwords in configuration
profile  Profile related commands - if no parameters are given, all profiles are selected
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>radio-qos-policy</td>
<td>Configure a radio quality-of-service policy</td>
</tr>
<tr>
<td>radius-group</td>
<td>Configure radius user group parameters</td>
</tr>
<tr>
<td>radius-server-policy</td>
<td>Create device onboard radius policy</td>
</tr>
<tr>
<td>radius-user-pool-policy</td>
<td>Configure Radius User Pool</td>
</tr>
<tr>
<td>rename</td>
<td>Clone configuration object</td>
</tr>
<tr>
<td>rf-domain</td>
<td>Create a RF Domain or enter rf-domain context for one or more rf-domains</td>
</tr>
<tr>
<td>rfs4000</td>
<td>RFS4000 wireless controller</td>
</tr>
<tr>
<td>rfs6000</td>
<td>RFS6000 wireless controller</td>
</tr>
<tr>
<td>rfs7000</td>
<td>RFS7000 wireless controller</td>
</tr>
<tr>
<td>roaming-assist-policy</td>
<td>Configure a roaming-assist policy</td>
</tr>
<tr>
<td>role-policy</td>
<td>Role based firewall policy</td>
</tr>
<tr>
<td>route-map</td>
<td>Dynamic routing route map Configuration</td>
</tr>
<tr>
<td>routing-policy</td>
<td>Policy Based Routing Configuration</td>
</tr>
<tr>
<td>rtl-server-policy</td>
<td>Configure a rtl server policy</td>
</tr>
<tr>
<td>schedule-policy</td>
<td>Configure a schedule policy</td>
</tr>
<tr>
<td>self</td>
<td>Config context of the device currently logged into</td>
</tr>
<tr>
<td>sensor-policy</td>
<td>Configure a sensor policy</td>
</tr>
<tr>
<td>smart-cache-policy</td>
<td>Configure a content caching</td>
</tr>
<tr>
<td>smart-rf-policy</td>
<td>Configure a Smart-RF policy</td>
</tr>
<tr>
<td>t5</td>
<td>T5 wireless controller</td>
</tr>
<tr>
<td>url-filter</td>
<td>Configure a url filter</td>
</tr>
<tr>
<td>url-list</td>
<td>Configure a URL list</td>
</tr>
<tr>
<td>vx9000</td>
<td>VX9000 wireless controller</td>
</tr>
<tr>
<td>web-filter-policy</td>
<td>Configure a web filter policy</td>
</tr>
<tr>
<td>wips-policy</td>
<td>Configure a wips policy</td>
</tr>
<tr>
<td>wlan</td>
<td>Create a new WLAN or enter WLAN configuration context for one or more WLANs</td>
</tr>
<tr>
<td>wlan-qos-policy</td>
<td>Configure a wlan quality-of-service policy</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
</tr>
</tbody>
</table>

<DEVICE>(config)#
## 4.1 Global Configuration Commands

*GLOBAL CONFIGURATION COMMANDS*

The following table summarizes Global Configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>aaa-policy</td>
<td>Creates a AAA policy and enters its configuration mode. This policy enables administrators to define access control within the network.</td>
<td>page 4-10</td>
</tr>
<tr>
<td>aaa-tacacs-policy</td>
<td>Creates a AAA-TACACS policy and enters its configuration mode. This policy provides access control to network devices such as routers, network access servers, and other computing devices through centralized servers.</td>
<td>page 4-18</td>
</tr>
<tr>
<td>alias</td>
<td>Creates network, VLAN, service, etc. aliases</td>
<td>page 4-11</td>
</tr>
<tr>
<td>ap621</td>
<td>Adds an AP621 to the network</td>
<td>page 4-19</td>
</tr>
<tr>
<td>ap622</td>
<td>Adds an AP622 to the network</td>
<td>page 4-20</td>
</tr>
<tr>
<td>ap650</td>
<td>Adds an AP650 to the network</td>
<td>page 4-21</td>
</tr>
<tr>
<td>ap6511</td>
<td>Adds an AP6511 to the network</td>
<td>page 4-22</td>
</tr>
<tr>
<td>ap6521</td>
<td>Adds an AP6521 to the network</td>
<td>page 4-23</td>
</tr>
<tr>
<td>ap6522</td>
<td>Adds an AP6522 to the network</td>
<td>page 4-24</td>
</tr>
<tr>
<td>ap6532</td>
<td>Adds an AP6532 to the network</td>
<td>page 4-25</td>
</tr>
<tr>
<td>ap6562</td>
<td>Adds an AP6562 to the network</td>
<td>page 4-26</td>
</tr>
<tr>
<td>ap71xx</td>
<td>Adds an AP71XX to the network</td>
<td>page 4-27</td>
</tr>
<tr>
<td>ap7502</td>
<td>Adds an AP7502 to the network</td>
<td>page 4-28</td>
</tr>
<tr>
<td>ap7522</td>
<td>Adds an AP7522 to the network</td>
<td>page 4-29</td>
</tr>
<tr>
<td>ap7532</td>
<td>Adds an AP7532 to the network</td>
<td>page 4-30</td>
</tr>
<tr>
<td>ap7562</td>
<td>Adds an AP7562 to the network</td>
<td>page 4-31</td>
</tr>
<tr>
<td>ap81xx</td>
<td>Adds an AP81XX to the network</td>
<td>page 4-32</td>
</tr>
<tr>
<td>ap82xx</td>
<td>Adds an AP82XX to the network</td>
<td>page 4-33</td>
</tr>
<tr>
<td>ap8432</td>
<td>Adds an AP8432 to the network</td>
<td>page 4-34</td>
</tr>
<tr>
<td>ap8533</td>
<td>Adds an AP8533 to the network</td>
<td>page 4-35</td>
</tr>
<tr>
<td>application</td>
<td>Creates an application definition and enters its configuration mode. This command allows you to create a customized application detection definition.</td>
<td>page 4-36</td>
</tr>
<tr>
<td>application-policy</td>
<td>Creates an application policy and enters its configuration mode. This policy defines the actions executed on recognized HTTP (e.g. Facebook), enterprise (e.g. Webex) and peer-to-peer (e.g. gaming) applications or application-categories.</td>
<td>page 4-45</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>association-acl-policy</td>
<td>Creates an association ACL policy and enters its configuration mode. This policy restricts access by specifying a client MAC address or range of addresses to either include or exclude from WLAN connectivity.</td>
<td>page 4-67</td>
</tr>
<tr>
<td>auto-provisioning-policy</td>
<td>Creates an auto provisioning policy and enters its configuration mode. This policy defines the process by which an access point discovers controllers and associates with it.</td>
<td>page 4-68</td>
</tr>
<tr>
<td>bgp</td>
<td>Configures Border Gateway Protocol (BGP) settings</td>
<td>page 4-69</td>
</tr>
<tr>
<td>bonjour-gw-discovery-policy</td>
<td>Creates a Bonjour GW Discovery policy and enters its configuration mode. This policy configures the VLANs on which Bonjour services are located. This feature is supported only on the RFS7000 and AP7131 platforms.</td>
<td>page 4-71</td>
</tr>
<tr>
<td>bonjour-gw-forwarding-policy</td>
<td>Configures a Bonjour GW Forwarding policy and enters its configuration mode. This policy enables the discovery of services on VLANs not visible to the device running the Bonjour Gateway. This feature is supported only on the RFS7000 and AP7131 platforms</td>
<td>page 4-73</td>
</tr>
<tr>
<td>bonjour-gw-query-forwarding-policy</td>
<td>Creates a Bonjour GW Query Forwarding policy and enters its configuration mode. This policy enables Bonjour query forwarding across multiple VLANs. This feature is supported only on the RFS7000 and AP7131 platforms.</td>
<td>page 4-74</td>
</tr>
<tr>
<td>captive portal</td>
<td>Creates a captive portal and enters its configuration mode</td>
<td>page 4-75</td>
</tr>
<tr>
<td>clear</td>
<td>Clears the event history</td>
<td>page 4-120</td>
</tr>
<tr>
<td>client-identity</td>
<td>Creates a client identity definition and enters its configuration mode. This feature enables client identification through DHCP device fingerprinting.</td>
<td>page 4-121</td>
</tr>
<tr>
<td>client-identity-group</td>
<td>Creates a new client identity group and enters its configuration mode</td>
<td>page 4-129</td>
</tr>
<tr>
<td>clone</td>
<td>Clones a specified configuration object</td>
<td>page 4-136</td>
</tr>
<tr>
<td>crypto-cmp-policy</td>
<td>Creates a crypto Certificate Management Protocol (CMP) policy and enters its configuration mode. CMP is an Internet protocol designed to obtain and manage digital certificates in a Public Key Infrastructure (PKI) network.</td>
<td>page 4-137</td>
</tr>
<tr>
<td>customize</td>
<td>Customizes the CLI command summary output</td>
<td>page 4-138</td>
</tr>
<tr>
<td>database-client-policy</td>
<td>Creates a database client policy and enters its configuration mode. The database client policy configures the IP address or hostname of the VX9000 hosting the Mongo database (MongoDB). Use this option when deploying a split Mongo/application setup.</td>
<td>page 4-149</td>
</tr>
<tr>
<td>database-policy</td>
<td>Creates a database policy and enters its configuration mode. This policy enables the deployment of a replica set from a single Mongo database (MongoDB) instance.</td>
<td>page 4-155</td>
</tr>
<tr>
<td>device</td>
<td>Specifies configuration on multiple devices</td>
<td>page 4-162</td>
</tr>
</tbody>
</table>
### Table 4.1 Global Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>device-categorization</td>
<td>Creates a device categorization list and enters its configuration mode. The list categorizes devices as sanctioned or neighboring. Categorization of devices enables quick identification and blocking of unsanctioned devices in the network.</td>
<td>page 4-164</td>
</tr>
<tr>
<td>dhcp-server-policy</td>
<td>Creates a DHCP server policy and enters its configuration mode. This policy allows hosts on an IP network to request and be assigned IP addresses and discover information about the network.</td>
<td>page 4-169</td>
</tr>
<tr>
<td>dhcpv6-server-policy</td>
<td>Creates a DHCPv6 server policy and enters its configuration mode. This policy configures hosts with IPv6 addresses, IP prefixes and other configuration attributes required on an IPv6 network.</td>
<td>page 4-170</td>
</tr>
<tr>
<td>dns-whitelist</td>
<td>Creates a DNS whitelist and enters its configuration mode. A DNS whitelist is used with a captive portal to provide access services to requesting wireless clients.</td>
<td>page 4-172</td>
</tr>
<tr>
<td>event-system-policy</td>
<td>Creates an Event system policy and enters its configuration mode. This policy enables administrators to create notification mechanisms using one, some, or all of the SNMP, syslog, controller forwarding, or email notification options available to the controller or service platform.</td>
<td>page 4-178</td>
</tr>
<tr>
<td>ex3500</td>
<td>Creates an EX3500 time range list and enters its configuration mode</td>
<td>page 4-194</td>
</tr>
<tr>
<td>ex3500-management-policy</td>
<td>Creates an EX3500 management policy and enters its configuration mode. This policy controls access to the EX3500 switch from management stations using SNMP.</td>
<td>page 4-200</td>
</tr>
<tr>
<td>ex3500-qos-class-map-policy</td>
<td>Creates an EX3500 QoS class map policy and enters its configuration mode. The QoS policy map assigns priority to mission critical EX3500 switch data traffic, prevent EX3500 switch bandwidth congestion, and prevent packet drops.</td>
<td>page 4-218</td>
</tr>
<tr>
<td>ex3500-qos-policy-map</td>
<td>Creates an EX3500 QoS policy map and enters its configuration mode. This policy defines rules that filter traffic exchanged between the EX3500 switch and its connected devices.</td>
<td>page 4-226</td>
</tr>
<tr>
<td>ex3524</td>
<td>Adds a EX3524 switch to the network</td>
<td>page 4-240</td>
</tr>
<tr>
<td>ex3548</td>
<td>Adds a EX3548 switch to the network</td>
<td>page 4-242</td>
</tr>
<tr>
<td>firewall-policy</td>
<td>Creates a firewall policy and enters its configuration mode. This policy configures safe guards against denial of service (DoS) attacks and packet storms. It also configures firewall parameters, such as logging, application layer gateway, TCP protocol checks, state flow checks, etc.</td>
<td>page 4-243</td>
</tr>
<tr>
<td>global-association-list</td>
<td>Creates a global list of client MAC addresses</td>
<td>page 4-245</td>
</tr>
<tr>
<td>guest-management</td>
<td>Creates a guest management policy and enters its configuration mode. This policy redirects guest users to a registration portal, upon association to a captive portal Service Set Identifier (SSID).</td>
<td>page 4-248</td>
</tr>
<tr>
<td>host</td>
<td>Sets the system's network name</td>
<td>page 4-258</td>
</tr>
<tr>
<td>inline-password-encryption</td>
<td>Stores the encryption key in the startup configuration file</td>
<td>page 4-259</td>
</tr>
</tbody>
</table>
GLOBAL CONFIGURATION COMMANDS 4-7

Table 4.1 Global Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip</td>
<td>Creates a IP access control list (ACL) and/or a Simple Network Management Protocol (SNMP) ACL, and enters its configuration mode</td>
<td>page 4-260</td>
</tr>
<tr>
<td>ipv6</td>
<td>Creates a IPv6 ACL and enters its configuration mode</td>
<td>page 4-262</td>
</tr>
<tr>
<td>ipv6-router-advertisement-policy</td>
<td>Creates an IPv6 router advertisement (RA) policy and enters its configuration mode</td>
<td>page 4-263</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>Creates Layer 2 Tunneling Protocol Version 3 (L2TPV3) tunnel policy and enters its configuration mode. This policy defines control and encapsulation protocols for tunneling layer 2 frames between two IP nodes.</td>
<td>page 4-281</td>
</tr>
<tr>
<td>mac</td>
<td>Configures MAC access lists (goes to the MAC ACL mode)</td>
<td>page 4-283</td>
</tr>
<tr>
<td>management-policy</td>
<td>Creates a management policy and enters its configuration context. This policy configures services that run on a device, such as welcome messages, banners, etc.</td>
<td>page 4-284</td>
</tr>
<tr>
<td>meshpoint</td>
<td>Creates a meshpoint and enters its configuration mode</td>
<td>page 4-286</td>
</tr>
<tr>
<td>meshpoint-qos-policy</td>
<td>Creates a meshpoint quality of service (QoS) policy and enters its configuration mode</td>
<td>page 4-288</td>
</tr>
<tr>
<td>mint-policy</td>
<td>Creates a MiNT security policy and enters its configuration mode</td>
<td>page 4-289</td>
</tr>
<tr>
<td>nac-list</td>
<td>Creates a network ACL and enters its configuration mode</td>
<td>page 4-290</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 4-296</td>
</tr>
<tr>
<td>nsight-policy</td>
<td>Creates an NSight policy and enters its configuration mode</td>
<td>page 4-300</td>
</tr>
<tr>
<td>passpoint-policy</td>
<td>Creates a new passpoint policy and enters its configuration mode</td>
<td>page 4-312</td>
</tr>
<tr>
<td>password-encryption</td>
<td>Enables password encryption</td>
<td>page 4-314</td>
</tr>
<tr>
<td>profile</td>
<td>Creates a device profile and enters its configuration mode</td>
<td>page 4-315</td>
</tr>
<tr>
<td>radio-qos-policy</td>
<td>Creates a radio qos policy and enters its configuration mode</td>
<td>page 4-319</td>
</tr>
<tr>
<td>radius-group</td>
<td>Creates a RADIUS group and enters its configuration mode</td>
<td>page 4-320</td>
</tr>
<tr>
<td>radius-server-policy</td>
<td>Creates a RADIUS server policy and enters its configuration mode</td>
<td>page 4-321</td>
</tr>
<tr>
<td>radius-user-pool-policy</td>
<td>Creates a RADIUS user pool policy and enters its configuration mode</td>
<td>page 4-322</td>
</tr>
<tr>
<td>rename</td>
<td>Renames and existing top-level object (TLO)</td>
<td>page 4-323</td>
</tr>
<tr>
<td>rf-domain</td>
<td>Creates an RF Domain and enters its configuration mode</td>
<td>page 4-326</td>
</tr>
<tr>
<td>rfs4000</td>
<td>Adds an RFS4000 to the network</td>
<td>page 4-365</td>
</tr>
<tr>
<td>rfs6000</td>
<td>Adds an RFS6000 to the network</td>
<td>page 4-362</td>
</tr>
<tr>
<td>rfs7000</td>
<td>Adds an RFS7000 to the network</td>
<td>page 4-363</td>
</tr>
</tbody>
</table>
Table 4.1 Global Config Commands

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<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>nx45xx</td>
<td>Adds an NX45XX to the network</td>
<td>page 4-364</td>
</tr>
<tr>
<td>nx5500</td>
<td>Adds an NX5500 to the network</td>
<td>page 4-366</td>
</tr>
<tr>
<td>nx65xx</td>
<td>Adds an NX65XX to the network</td>
<td>page 4-368</td>
</tr>
<tr>
<td>nx75xx</td>
<td>Adds an NX75XX to the network</td>
<td>page 4-368</td>
</tr>
<tr>
<td>nx9000</td>
<td>Adds a NX9000, NX9500, or NX9510 to the network</td>
<td>page 4-369</td>
</tr>
<tr>
<td>roaming-assist-policy</td>
<td>Configures a roaming assist policy and enters its configuration mode. This policy enables access points to assist wireless clients in making roaming decisions, such as which access point to connect, etc.</td>
<td>page 4-370</td>
</tr>
<tr>
<td>role-policy</td>
<td>Creates a role policy and enters its configuration mode</td>
<td>page 4-371</td>
</tr>
<tr>
<td>route-map</td>
<td>Creates a dynamic BGP route map and enters its configuration mode</td>
<td>page 4-372</td>
</tr>
<tr>
<td>routing-policy</td>
<td>Creates a routing policy and enters its configuration mode</td>
<td>page 4-373</td>
</tr>
<tr>
<td>rtl-server-policy</td>
<td>Creates an RTL server policy and enters its configuration mode. The RTL server policy provides the exact location (URL) at which the Euclid server can be reached.</td>
<td>page 4-374</td>
</tr>
<tr>
<td>schedule-policy</td>
<td>Creates a schedule policy and enters its configuration mode</td>
<td>page 4-379</td>
</tr>
<tr>
<td>self</td>
<td>Displays a logged device’s configuration context</td>
<td>page 4-385</td>
</tr>
<tr>
<td>sensor-policy</td>
<td>Creates a sensor policy and enters its configuration mode</td>
<td>page 4-386</td>
</tr>
<tr>
<td>smart-rf-policy</td>
<td>Creates a Smart RF policy and enters its configuration mode</td>
<td>page 4-395</td>
</tr>
<tr>
<td>t5</td>
<td>Configures a t5 wireless controller. This command is applicable only on the RFS4000, RFS6000, RFS7000, NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600 platforms.</td>
<td>page 4-396</td>
</tr>
<tr>
<td>web-filter-policy</td>
<td>Creates a Web Filtering policy and enters its configuration mode</td>
<td>page 4-398</td>
</tr>
<tr>
<td>wips-policy</td>
<td>Creates a WIPS policy and enters its configuration mode</td>
<td>page 4-408</td>
</tr>
<tr>
<td>wlan</td>
<td>Creates a Wireless Local Area Network (WLAN) and enters its configuration mode</td>
<td>page 4-409</td>
</tr>
<tr>
<td>wlan-qos-policy</td>
<td>Creates a WLAN QoS policy and enters its configuration mode</td>
<td>page 4-502</td>
</tr>
<tr>
<td>smart-cache-policy</td>
<td>Creates a smart cache policy and enters its configuration mode. This policy enables content caching to allow temporary storing of frequently accessed content on an intermediate network device. This command is specific to the NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, and NX9600 series service platforms.</td>
<td>page 4-504</td>
</tr>
<tr>
<td>url-filter</td>
<td>Creates an URL filter and enters its configuration mode. URL filtering is a licensed feature.</td>
<td>page 4-522</td>
</tr>
</tbody>
</table>
### Table 4.1 Global Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>url-list</td>
<td>Creates an URL list and enters its configuration mode. This command is specific to the NX4500, NX4524, NX6500, and NX6524 series service platforms.</td>
<td>page 4-535</td>
</tr>
<tr>
<td>vx9000</td>
<td>Configures a Virtual WLAN Controller (V-WLC) in a virtual machine (VM) environment</td>
<td>page 4-541</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character.
4.1.1 aaa-policy

Global Configuration Commands

Configures an Authentication, Accounting, and Authorization (AAA) policy. This policy configures multiple servers for authentication and authorization. Up to six servers can be configured for providing AAA services.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

aaa-policy <AAA-POLICY-NAME>

Parameters

- aaa-policy <AAA-POLICY-NAME>

Examples

rfs7000-37FABE(config)#aaa-policy test
rfs7000-37FABE(config-aaa-policy-test)#?

AAA Policy Mode commands:

- accounting Configure accounting parameters
- attribute Configure RADIUS attributes in access and accounting requests
- authentication Configure authentication parameters
- health-check Configure server health-check parameters
- mac-address-format Configure the format in which the MAC address must be filled in the Radius-Request frames
- no Negate a command or set its defaults
- proxy-attribute Configure radius attribute behavior when proxying through controller or rf-domain-manager
- server-pooling-mode Configure the method of selecting a server from the pool of configured AAA servers
- use Set setting to use

clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
drop End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

rfs7000-37FABE(config-aaa-policy-test)#

Related Commands

no Removes an existing AAA policy

NOTE: For more information on the AAA policy commands, see Chapter 8, AAA-POLICY.
4.1.2 alias

Global Configuration Commands

Configures network, VLAN, host, string, and network-service aliases

Aliases are objects having a unique name and content that is determined by the alias type (network, VLAN, and network-service).

A typical large enterprise network consists of multiple sites (RF Domains) having similar configuration parameters with few elements that vary, such as networks or network ranges, hosts having different IP addresses, and VLAN IDs or URLs. These elements can be defined as aliases (object oriented wireless firewalls) and used across sites by applying overrides to the object definition. Using aliases results in a configuration that is easier to understand and maintain.

Multiple instances of an alias (same type and same name) can be defined at any of the following levels: global, RF Domain, profile, or device. An alias defined globally functions as a top-level-object (TLO). Global aliases are not mandatory, and can be defined at the domain-level, or profile, or device-level only. An alias defined on a device is applicable to that device only. An alias defined on a profile applies to every device using the profile. Similarly, aliases defined at the RF Domain level apply to all devices within that domain.

Aliases defined at any given level can be overridden at any of the next lower levels. For example, a global alias can be redefined on a selected set of RF Domains, profiles, or devices. Overrides applied at the device level take precedence.

Aliases can be classified as:

- **address-range alias** – Maps a name to a range of IP addresses. An address-range alias can be utilized at different deployments. For example, if an ACL defines a pool of network addresses as 192.168.10.10 through 192.168.10.100 for an entire network, and a remote location's network range is 172.16.13.110 to 172.16.13.110, the remote location's ACL can be overridden using an alias. At the remote location, the ACL works with the 172.16.13.20-111 address range. A new ACL need not be created specifically for the remote deployment location.

- **host alias** – Maps a name to a specific host (identified by its IP address. For example, 192.168.10.23). A host alias can be utilized at different deployments. For example, if a central network DNS server is set a static IP address, and a remote location's local DNS server is defined, this host can be overridden at the remote location. At the remote location, the network is functional with a local DNS server, but uses the name set at the central network. A new host need not be created at the remote location. This simplifies creating and managing hosts and allows an administrator to better manage specific local requirements.

- **network alias** – Maps a name to a network. A network alias can be utilized at different deployments. For example, if a central network ACL defines a network as 192.168.10.0/24, and a remote location's network range is 172.16.10.0/24, the ACL can be overridden at the remote location to suit their local (but remote) requirement. At the remote location, the ACL functions with the 172.16.10.0/24 network. A new ACL need not be created specifically for the remote deployment. This simplifies ACL definition and allows an administrator to better manage specific local requirements.

- **network-group alias** – Maps a name to a single or a range of addresses of devices, hosts, and network configurations. Network configurations are complete networks in the form 192.168.10.0/24 or IP address range in the form 192.168.10.10-192.168.10.20.

  A network-group alias can contain a maximum of eight (8) host entries, eight (8) network entries, and eight (8) IP address-range entries. A maximum of 32 network-group alias entries can be created.

  A network-group alias can be used in IP firewall rules to substitute hosts, subnets, and IP address ranges.

- **network-service alias** – Maps a name to service protocols and ports to match. Both source and destination ports are configurable. For each protocol, up to 2 source port ranges and up to 2 destination port ranges can be configured. A maximum of 4 protocol entries can be configured per network-service alias. When used with an ACL, the network-service alias defines the service-specific components of the ACL rule. Overrides can be applied to the service alias, at the device level, without modifying the ACL. Application of overrides to the service alias allows an ACL to be used across sites.
Use a network-service alias to associate more than one IP address to a network interface, providing multiple connections to a network from a single IP node.

NOTE: When used with ACLs, network, network-group, and network-service aliases act as enhanced firewalls.

- **number alias** – Maps a name to a number
- **vlan alias** – Maps a name to a VLAN ID. A VLAN alias can be used at different deployments. For example, if a named VLAN is defined as 10 for the central network, and the VLAN is set at 26 at a remote location, the VLAN can be overridden at the deployment location with an alias. At the remote deployment location, the network is functional with a VLAN ID of 26 but utilizes the name defined at the centrally managed network. A new VLAN need not be created specifically for the remote deployment.
- **string alias** – Maps a name to a specific string (for example, RF Domain name). A host alias can be utilized at different deployments. For example, if the main domain at a remote location is called `loc1.domain.com` and at another deployment location it is called `loc2.domain.com`, the alias can be overridden at the remote location to suit the local (but remote) requirement. At one remote location, the alias functions with the `loc1.domain.com` domain and at the other with the `loc2.domain.com` domain.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
alias [address-range|host|network|network-group|network-service|number|string|vlan]
alias address-range <ADDRESS-RANGE-ALIAS-NAME> <STARTING-IP> to <ENDING-IP>
alias host <HOST-ALIAS-NAME> <HOST-IP>
alias network <NETWORK-ALIAS-NAME> <NETWORK-ADDRESS/MASK>
alias network-group <NETWORK-GROUP-ALIAS-NAME> [address-range|host|network]
alias network-group <NETWORK-GROUP-ALIAS-NAME> [address-range <STARTING-IP> to <ENDING-IP>] [host <HOST-IP>]
alias network-service <NETWORK-SERVICE-ALIAS-NAME> proto [<0-254]|<WORD>|eigrp|gre|igmp|igp|ospf|vrrp] 
  ({<1-65535>|<WORD>|bgp|dns|ftp|ftp-data|gopher|https|ldap|nttp|nntp|pop3|proto|sip|smtp|sourceport|ssh|telnet|tftp|www})
alias network-service <NETWORK-SERVICE-ALIAS-NAME> proto [<0-254]|<WORD>|eigrp|gre|igmp|igp|ospf|vrrp] 
  ({<1-65535>|<WORD>|bgp|dns|ftp|ftp-data|gopher|https|ldap|nttp|nntp|pop3|proto|sip|smtp|sourceport <1-65535>|<WORD>|ssh|telnet|tftp|www})
alias number <NUMBER-ALIAS-NAME> <0-4294967295>
alias string <STRING-ALIAS-NAME> <LINE>
alias vlan <VLAN-ALIAS-NAME> <1-4094>
```

**Parameters**

- `alias address-range <ADDRESS-RANGE-ALIAS-NAME> <STARTING-IP> to <ENDING-IP>`
  - Creates a address range alias, defining a range of IP addresses
  - `<ADDRESS-RANGE-ALIAS-NAME>` – Specify the address range alias name.
    - **Note:** Alias name should begin with `$`.  

---

**NOTE:**
When used with ACLs, network, network-group, and network-service aliases act as enhanced firewalls.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>alias host <code>&lt;HOST-ALIAS-NAME&gt;</code> <code>&lt;HOST-IP&gt;</code></td>
<td>Associates the network host’s IP address with this host alias. For example, 'alias host $HOST 1.1.1.100'. In this example, the host alias name is: <code>$HOST</code> and the host IP address it is mapped to is: <code>1.1.1.100</code>.</td>
</tr>
<tr>
<td>host <code>&lt;HOST-ALIAS-NAME&gt;</code></td>
<td>Creates a host alias, defining a single network host. <code>&lt;HOST-ALIAS-NAME&gt;</code> – Specify the host alias name. <strong>Note:</strong> Alias name should begin with <code>$</code>.</td>
</tr>
<tr>
<td>alias network <code>&lt;NETWORK-ALIAS-NAME&gt;</code> <code>&lt;NETWORK-ADDRESS/MASK&gt;</code></td>
<td>Associates a single network with this network alias. For example, 'alias network $NET 1.1.1.0/24'. In this example, the network alias name is: <code>$NET</code> and the network it is mapped to is: <code>1.1.1.0/24</code>. <code>&lt;NETWORK-ADDRESS/MASK&gt;</code> – Specify the network's address and mask.</td>
</tr>
<tr>
<td>network <code>&lt;NETWORK-ALIAS-NAME&gt;</code></td>
<td>Creates a network alias, defining a single network address. <code>&lt;NETWORK-ALIAS-NAME&gt;</code> – Specify the network alias name. <strong>Note:</strong> Alias name should begin with <code>$</code>.</td>
</tr>
<tr>
<td>address-range <code>&lt;STARTING-IP&gt;</code> to <code>&lt;ENDING-IP&gt;</code> <code>{&lt;STARTING-IP&gt; to &lt;ENDING-IP&gt;}</code></td>
<td>Associates a range of IP addresses with this network-group alias. <code>&lt;STARTING-IP&gt;</code> – Specify the first IP address in the range. <code>&lt;ENDING-IP&gt;</code> – Specify the last IP address in the range. <code>&lt;STARTING-IP&gt;</code> to <code>&lt;ENDING-IP&gt;</code> – Optional. Specifies more than one range of IP addresses. A maximum of eight (8) IP address ranges can be configured.</td>
</tr>
<tr>
<td>host <code>&lt;HOST-IP&gt;</code> <code>{&lt;HOST-IP&gt;}</code></td>
<td>Associates a single or multiple hosts with this network-group alias. <code>&lt;HOST-IP&gt;</code> – Specify the hosts' IP address. <code>&lt;HOST-IP&gt;</code> – Optional. Specifies more than one host. A maximum of eight (8) hosts can be configured.</td>
</tr>
<tr>
<td>network <code>&lt;NETWORK-ADDRESS/MASK&gt;</code> <code>{&lt;NETWORK-ADDRESS/MASK&gt;}</code></td>
<td>Associates a single or multiple networks with this network-group alias. <code>&lt;NETWORK-ADDRESS/MASK&gt;</code> – Specify the network’s address and mask. <code>&lt;NETWORK-ADDRESS/MASK&gt;</code> – Optional. Specifies more than one network. A maximum of eight (8) networks can be configured.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>alias network-service &lt;NETWORK-SERVICE-ALIAS-NAME&gt;</th>
<th>Configures an alias that specifies available network services and the corresponding source and destination software ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;NETWORK-SERVICE-ALIAS-NAME&gt; – Specify a network-service alias name.</td>
<td></td>
</tr>
<tr>
<td>Note:</td>
<td>Alias name should begin with '$'.</td>
</tr>
<tr>
<td>Note:</td>
<td>Network-service aliases are used in ACLs, to define the service-specific components. ACLs using aliases can be used across sites by re-defining the network-service alias elements at the device or profile level.</td>
</tr>
<tr>
<td>proto [&lt;0-254&gt;</td>
<td>&lt;WORD&gt;</td>
</tr>
<tr>
<td>• &lt;0-254&gt; – Identifies the protocol by its number. Specify the protocol number from 0 - 254. This is the number by which the protocol is identified in the Protocol field of the IPv4 header and the Next Header field of IPv6 header. For example, the User Datagram Protocol's (UDP) designated number is 17.</td>
<td></td>
</tr>
<tr>
<td>• &lt;WORD&gt; – Identifies the protocol by its name. Specify the protocol name.</td>
<td></td>
</tr>
<tr>
<td>• gre – Selects Generic Routing Encapsulation (GRE). The protocol number is 47.</td>
<td></td>
</tr>
<tr>
<td>• igmp – Selects Internet Group Management Protocol (IGMP). The protocol number is 2.</td>
<td></td>
</tr>
<tr>
<td>• igp – Selects Interior Gateway Protocol (IGP). The protocol number is 9.</td>
<td></td>
</tr>
<tr>
<td>• ospf – Selects Open Shortest Path First (OSPF). The protocol number is 89.</td>
<td></td>
</tr>
<tr>
<td>• vrrp – Selects Virtual Router Redundancy Protocol (VRRP). The protocol number is 112.</td>
<td></td>
</tr>
<tr>
<td>{(&lt;1-65535&gt;</td>
<td>&lt;WORD&gt;</td>
</tr>
<tr>
<td>• &lt;1-65535&gt; – Optional. Configures a destination port number from 1 - 65535</td>
<td></td>
</tr>
<tr>
<td>• &lt;WORD&gt; – Optional. Identifies the destination port by the service name provided. For example, the secure shell (SSH) service uses TCP port 22.</td>
<td></td>
</tr>
<tr>
<td>• bgp – Optional. Configures the default Border Gateway Protocol (BGP) services port (179)</td>
<td></td>
</tr>
<tr>
<td>• dns – Optional. Configures the default Domain Name System (DNS) services port (53)</td>
<td></td>
</tr>
<tr>
<td>• ftp – Optional. Configures the default File Transfer Protocol (FTP) control services port (21)</td>
<td></td>
</tr>
<tr>
<td>• ftp-data – Optional. Configures the default FTP data services port (20)</td>
<td></td>
</tr>
<tr>
<td>• gopher – Optional. Configures the default gopher services port (70)</td>
<td></td>
</tr>
<tr>
<td>• https – Optional. Configures the default HTTPS services port (443)</td>
<td></td>
</tr>
<tr>
<td>• ldap – Optional. Configures the default Lightweight Directory Access Protocol (LDAP) services port (389)</td>
<td></td>
</tr>
<tr>
<td>• nntp – Optional. Configures the default Newsgroup (NNTP) services port (119)</td>
<td></td>
</tr>
<tr>
<td>• ntp – Optional. Configures the default Network Time Protocol (NTP) services port (123)</td>
<td></td>
</tr>
</tbody>
</table>
Contd..
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>alias number</td>
<td>Creates a number alias identified by the &lt;NUMBER-ALIAS-NAME&gt; keyword. Number aliases map a name to a numeric value. For example, 'alias number $NUMBER 100'</td>
</tr>
<tr>
<td></td>
<td>• The number alias name is: $NUMBER</td>
</tr>
<tr>
<td></td>
<td>• The value assigned is: 100</td>
</tr>
<tr>
<td></td>
<td>The value referenced by alias $NUMBER, wherever used, is 100.</td>
</tr>
<tr>
<td></td>
<td>• &lt;NUMBER-ALIAS-NAME&gt; – Specify the number alias name.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-4294967295&gt; – Specify the number, from 0 - 4294967295, assigned to the number alias created.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Alias name should begin with ‘$’.</td>
</tr>
<tr>
<td>alias string</td>
<td>Creates a string alias identified by the &lt;STRING-ALIAS-NAME&gt; keyword</td>
</tr>
<tr>
<td></td>
<td>• &lt;STRING-ALIAS-NAME&gt; – Specify the string alias name.</td>
</tr>
<tr>
<td></td>
<td>• &lt;LINE&gt; – Specify the string value.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> String aliases map a name to an arbitrary string value. For example, 'alias string $DOMAIN test.example_company.com'.</td>
</tr>
<tr>
<td></td>
<td>• The string alias name is: $DOMAIN</td>
</tr>
<tr>
<td></td>
<td>• The value assigned is: test.example_company.com (a domain name)</td>
</tr>
<tr>
<td></td>
<td>The value referenced by alias $DOMAIN, wherever used, is test.example_company.com.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Alias name should begin with ‘$’.</td>
</tr>
<tr>
<td>alias vlan</td>
<td>Creates a VLAN alias identified by the &lt;VLAN-ALIAS-NAME&gt; keyword</td>
</tr>
<tr>
<td></td>
<td>• &lt;VLAN-ALIAS-NAME&gt; – Specify the VLAN alias name.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Alias name should begin with ‘$’.</td>
</tr>
<tr>
<td>&lt;1-4094&gt;</td>
<td>Maps the VLAN alias to a VLAN ID</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4094&gt; – Specify the VLAN ID from 1 - 4094.</td>
</tr>
</tbody>
</table>
Examples

```
rfs4000-229D58(config)#alias address-range $TestAddRanAlias 192.168.13.10 to 192.168.13.13
rfs4000-229D58(config)#alias network $TestNetworkAlias 192.168.13.0/24
rfs4000-229D58(config)#alias host $TestHostAlias 192.168.13.10
rfs4000-229D58(config)#alias vlan $TestVLANAlias 1
rfs4000-229D58(config)#alias network-group $TestNetGrpAlias address-range 192.168.13.7 to 192.168.13.16 192.168.13.20 to 192.168.13.25
rfs4000-229D58(config)#commit
rfs4000-229D58(config)#alias network-group $TestNetGrpAlias network 192.168.13.0/24 192.168.16.0/24
rfs4000-229D58(config)#commit
rfs4000-229D58(config)#alias network-service $NetworkServAlias proto 17
rfs4000-229D58(config)#commit
rfs4000-229D58(config)#show context
```

```
! Configuration of RFS4000 version 5.8.4.0-004D
!
version 2.5
!
alias network-group $TestNetGrpAlias network 192.168.13.0/24 192.168.16.0/24
alias network-group $TestNetGrpAlias address-range 192.168.13.7 to 192.168.13.16
192.168.13.20 to 192.168.13.25
!
alias network $TestNetworkAlias 192.168.13.0/24
!
alias host $TestHostAlias 192.168.13.10
!
alias address-range $TestAddRanAlias 192.168.13.10 to 192.168.13.13
!
alias network-service $NetworkServAlias proto udp
!
alias vlan $TestVLANAlias 1
!
ip access-list BROADCAST-MULTICAST-CONTROL
  permit tcp any any rule-precedence 10 rule-description "permit all TCP traffic"
--More--
rfs4000-229D58(config)#
```

Example 1:

```
rfs4000-229D58(config)#alias network-group $test host 192.168.1.10 192.168.1.11
rfs4000-229D58(config)#alias network-group $test network 192.168.2.0/24 192.168.3.0/24
rfs4000-229D58(config)#alias network-group $test address-range 192.168.4.10 to 192.168.4.20
```

In the preceding example, the network-group alias '$test' includes hosts 192.168.1.10 and 192.168.1.11, networks 192.168.2.0/24 and 192.168.3.0/24 and address-range 192.168.4.10 to 192.168.4.20.
Example 2:
rfs4000-229D58(config)#alias network-service $kerberos proto tcp 749 750 80 proto tcp sourceport 20 proto udp 68 sourceport 67
rfs4000-229D58(config)#commit

In the preceding example, the network-service alias ‘$kerberos’ is configured to allow following traffic:

- TCP traffic to destination ports 749, 750, and 80
- TCP traffic from source port 20
- UDP traffic to destination port 68 and from source port 67

rfs4000-229D58(config)#alias string $DOMAIN test.example_company.com
rfs4000-229D58(config)#show context

--More--

nx9500-6C8809(config)#alias number $NUMBER 100
nx9500-6C8809(config)#show context include-factory | include alias
alias string $DOMAIN test.examplecompany.com
alias string $DOMAIN2 test.example_company.com
alias string $NUMBER 100
--More--

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an existing network, VLAN, service, or string alias</td>
</tr>
</tbody>
</table>
4.1.3 aaa-tacacs-policy

Global Configuration Commands

Configures AAA Terminal Access Controller Access-Control System (TACACS) policy. TACACS is CISCO protocol that provides access control to network devices such as routers, network access servers, and other computing devices through one or more centralized servers. A TACACS Authentication server should be configured when the server preference is authenticated server.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

aaa-tacacs-policy <AAA-TACACS-POLICY-NAME>

Parameters

- aaa-tacacs-policy <AAA-TACACS-POLICY-NAME>

Examples

rfs7000-37FABE(config)#aaa-tacacs-policy testpolicy
rfs7000-37FABE(config-aaa-tacacs-policy-testpolicy)#?
AAA TACACS Policy Mode commands:
accounting Configure accounting parameters
authentication Configure authentication parameters
authorization Configure authorization parameters
no Negate a command or set its defaults
clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
show Show running system information
write Write running configuration to memory or terminal

rfs7000-37FABE(config-aaa-tacacs-policy-testpolicy)#

Related Commands

no Removes an existing AAA TACACS policy

NOTE: For more information on the AAA-TACACS policy commands, see Chapter 25, AAA-TACACS-POLICY.
4.1.4 ap621

Global Configuration Commands

Adds an AP621 to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ap621 <MAC>

Parameters

- <MAC> Specify the AP621’s MAC address.

Examples

rfs7000-37FABE(config)#ap621 5C-0E-8B-E3-C3-56
rfs7000-37FABE(config-device-5C-0E-8B-E3-C3-56)#show context
ap621 5C-0E-8B-E3-C3-56
  use profile default-ap621
  use rf-domain default
  hostname ap621-E3C356
rfs7000-37FABE(config-device-5C-0E-8B-E3-C3-56)#

rfs7000-37FABE(config)#show wireless ap configured

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap621-E3C356</td>
<td>5C-0E-8B-E3-C3-56</td>
<td>default-ap621</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config)#

Related Commands

no Removes an AP621 from the network
4.1.5 ap622

Global Configuration Commands

Adds an AP622 to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
ap622 <MAC>
```

Parameters

- `<MAC>` Specify the AP622’s MAC address.

Examples

```
rfs7000-37FABE(config)#ap622 B4-C7-99-43-C3-DC
rfs7000-37FABE(config-device-B4-C7-99-43-C3-DC)#show context
ap622 B4-C7-99-43-C3-DC
use profile default-ap622
use rf-domain default
hostname ap622-43C3DC
rfs7000-37FABE(config-device-B4-C7-99-43-C3-DC)#
```

```
rfs7000-37FABE(config)#show wireless ap configured
```

```
IDX | NAME                | MAC              | PROFILE       | RF-DOMAIN | ADOPTED-BY
--- | -------------------- | ----------------- | -------------- | --------- | -----------
1   | ap621-E3C356        | 5C-0E-8B-E3-C3-56 | default-ap621 | default   | un-adopted  |
2   | ap622-43C3DC        | B4-C7-99-43-C3-DC | default-ap622 | default   | un-adopted  |
```

```
rfs7000-37FABE(config)#
```

Related Commands

- `no` Removes an AP622 from the network
### 4.1.6 ap650

**Global Configuration Commands**

Adds an AP650 to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ap650 <MAC>
```

**Parameters**

- `ap650 <MAC>`

**Examples**

```
> ap650 5C-0E-8B-34-81-BC
> use profile default-ap650
> use rf-domain default
> hostname ap650-3481BC
```

```
rfs7000-37FABE(config)#show wireless ap configured

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap621-E3C356</td>
<td>5C-0E-8B-E3-C3-56</td>
<td>default-ap621</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap622-43C3DC</td>
<td>B4-C7-99-43-C3-DC</td>
<td>default-ap622</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>3</td>
<td>ap650-3481BC</td>
<td>5C-0E-8B-34-81-BC</td>
<td>default-ap650</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>
```

**Related Commands**

- `no` Removes an AP650 from the network
4.1.7 ap6511

Global Configuration Commands

Adds an AP6511 to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
ap6511 <MAC>
```

Parameters

- ap6511 <MAC>

Examples

```
rfs7000-37FABE(config)#ap6511 5C-0E-8B-08-45-6A
rfs7000-37FABE(config-device-5C-0E-8B-08-45-6A)#show context ap6511 5C-0E-8B-08-45-6A
use profile default-ap6511
use rf-domain default
hostname ap6511-08456A
license AAP DEFAULT-LICENSE
rfs7000-37FABE(config-device-5C-0E-8B-08-45-6A)#
```

```
rfs7000-37FABE(config)#show wireless ap configured
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap621-E3C356</td>
<td>5C-0E-8B-E3-C3-56</td>
<td>default-ap621</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap622-43C3DC</td>
<td>B4-C7-99-43-C3-DC</td>
<td>default-ap622</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>3</td>
<td>ap650-3481BC</td>
<td>5C-0E-8B-34-81-BC</td>
<td>default-ap650</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>4</td>
<td>ap6511-08456A</td>
<td>5C-0E-8B-08-45-6A</td>
<td>default-ap6511</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
```

```
rfs7000-37FABE(config)#
```

Related Commands

```
no
```

Removes an AP6511 from the network
4.1.8 ap6521

Global Configuration Commands

Adds an AP6521 to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ap6521 <MAC>

Parameters
- ap6521 <MAC>

Examples

nx9500-6C8809(config)#ap6521 FC-0A-81-42-93-6C
nx9500-6C8809(config-device-FC-0A-81-42-93-6C)#show context
ap6521 FC-0A-81-42-93-6C
use profile default-ap6521
use rf-domain default
hostname ap6521-42936C
nx9500-6C8809(config-device-FC-0A-81-42-93-6C)#

nx9500-6C8809(config)#show wireless ap configured

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap6521-42936C</td>
<td>FC-0A-81-42-93-6C</td>
<td>default-ap6521</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
</tbody>
</table>

nx9500-6C8809(config)#

Related Commands

no

Removes an AP6521 from the network
4.9.9 ap6522

- **Global Configuration Commands**

  Adds an AP6522 to the network. If a profile for the AP is not available, a new profile is created.

  Supported in the following platforms:
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ap6522 <MAC>
```

**Parameters**

- `<MAC>`

**Examples**

```
nx9500-6C8809(config)#ap6522 B4-C7-99-58-72-58
nx9500-6C8809(config-device-B4-C7-99-58-72-58)#show context
ap6522 B4-C7-99-58-72-58
use profile default-ap6522
use rf-domain default
hostname ap6522-587258
nx9500-6C8809(config-device-B4-C7-99-58-72-58)#

nx9500-6C8809(config)#show wireless ap configured
```

```
<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap6521-42936C</td>
<td>FC-0A-81-42-93-6C</td>
<td>default-ap6521</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
<tr>
<td>2</td>
<td>ap6522-587258</td>
<td>B4-C7-99-58-72-58</td>
<td>default-ap6522</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
</tbody>
</table>
```

```
nx9500-6C8809(config)#
```

**Related Commands**

- **no**

  Removes an AP6522 from the network
4.1.10 ap6532

Global Configuration Commands

Add an AP6532 to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
ap6532 <MAC>

Parameters
- <MAC> Specify the AP6532’s MAC address.

Examples
nx9500-6C8809(config)#ap6532 00-23-68-31-16-59
nx9500-6C8809(config-device-B4-C7-99-58-72-58)#show context
ap6532 00-23-68-31-16-59
use profile default-ap6532
use rf-domain default
hostname ap6532-311659
nx9500-6C8809(config-device-00-23-68-31-16-59)#

nx9500-6C8809(config)#show wireless ap configured

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap6521-42936C</td>
<td>FC-0A-81-42-93-6C</td>
<td>default-ap6521</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
<tr>
<td>2</td>
<td>ap6522-587258</td>
<td>B4-C7-99-58-72-58</td>
<td>default-ap6522</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
<tr>
<td>3</td>
<td>ap6532-311659</td>
<td>00-23-68-31-16-59</td>
<td>default-ap6532</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
</tbody>
</table>

nx9500-6C8809(config)#

Related Commands
	no Removes an AP6532 from the network
4.1.11 ap6562

*Global Configuration Commands*

Adds an AP6562 to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`ap6562 <MAC>`

**Parameters**

- `ap6562 <MAC>`

**Examples**

```
nx9500-6C8809(config)#ap6562 00-23-09-0E-12-60
```

```
nx9500-6C8809(config-device-00-23-09-0E-12-60)#show context
```

```
ap6562 00-23-09-0E-12-60
  use profile default-ap6562
  use rf-domain default
  hostname ap6562-0E1260
```

```
nx9500-6C8809(config-device-00-23-09-0E-12-60)#
```

```
nx9500-6C8809(config)#show wireless ap configured
```

```
<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap6521-42936C</td>
<td>FC-0A-81-42-93-6C</td>
<td>default-ap6521</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
<tr>
<td>2</td>
<td>ap6522-587258</td>
<td>B4-C7-99-58-72-58</td>
<td>default-ap6522</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
<tr>
<td>3</td>
<td>ap6532-311659</td>
<td>00-23-68-31-16-59</td>
<td>default-ap6532</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
<tr>
<td>4</td>
<td>ap6562-0E1260</td>
<td>00-23-09-0E-12-60</td>
<td>default-ap6562</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
</tbody>
</table>
```

```
nx9500-6C8809(config)#
```

**Related Commands**

- `no` Removes an AP6562 from the network
4.1.12 ap71xx

Global Configuration Commands

Adds an AP71XX series to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
ap71xx <MAC>

Parameters
- ap71xx <MAC>

Examples
nx4500-5CFA2B(config)#ap71xx 00-23-68-11-E6-C4
nx4500-5CFA2B(config-device-00-23-68-11-E6-C4)#show context
ap71xx 00-23-68-11-E6-C4
  use profile default-ap71xx
  use rf-domain default
  hostname ap7131-11E6C4
nx4500-5CFA2B(config-device-00-23-68-11-E6-C4)#s

nx4500-5CFA2B(config)#show wireless ap configured
IDX       NAME               MAC              PROFILE       RF-DOMAIN        ADOPTED-BY
---------------------------------------------------------------------------------------
1  ap7131-11E6C4  00-23-68-11-E6-C4  default-ap71xx  default     B4-C7-99-5C-FA-2B
2  rfs4000-229D58 00-23-68-22-9D-58  default-rfs4000  default
---------------------------------------------------------------------------------------
nx4500-5CFA2B(config)#

Related Commands

no

Removes an AP71XX from the network
4.1.13 ap7502

Global Configuration Commands

Adds an AP7502 series to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ap7502 <MAC>

Parameters

- ap7502 <MAC>

Examples

rfs7000-37FABE(config)#ap7502 00-23-68-99-BF-A8
rfs7000-37FABE(config-device-00-23-68-99-BF-A8)#

Related Commands

- no
  Removes an AP7502 from the network
### 4.1.14 ap7522

**Global Configuration Commands**

Adds an AP7522 series to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ap7522 <MAC>
```

**Parameters**

- `ap7522 <MAC>`

<table>
<thead>
<tr>
<th>&lt;MAC&gt;</th>
<th>Specify the AP7522’s MAC address.</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config)#ap7522 00-23-09-0E-12-63
rfs7000-37FABE(config-device-00-23-09-0E-12-63)#
```

**Related Commands**

- `no` Removes an AP7522 from the network
4.1.15 *ap7532*

*Global Configuration Commands*

Adds an AP7532 series to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ap7532 <MAC>
```

**Parameters**

- `ap7532 <MAC>`

<table>
<thead>
<tr>
<th>&lt;MAC&gt;</th>
<th>Specify the AP7532’s MAC address.</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config)#ap7532 00-23-09-0E-12-71
rfs7000-37FABE(config-device-00-23-09-0E-12-71)#
```

**Related Commands**

- `no` | Removes an AP7532 from the network |
### 4.1.16 ap7562

> **Global Configuration Commands**

Adds an AP7562 series to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ap7562 <MAC>
```

**Parameters**

- `ap7562 <MAC>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MAC&gt;</td>
<td>Specify the AP7562's MAC address.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config)#ap7562 84-24-8D-80-C2-AC
rfs7000-37FABE(config-device-84-24-8D-80-C2-AC)#
```

**Related Commands**

- `no` | Removes an AP7562 from the network |
4.1.17 **ap81xx**

*Global Configuration Commands*

Adds an AP81XX series to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ap81xx <MAC>
```

**Parameters**

- `ap81xx <MAC>`

**Examples**

```
rfs6000-81742D#ap81xx B4-C7-99-71-17-28
rfs6000-81742D(config-device-B4-C7-99-71-17-28)#show context
    ap8132 B4-C7-99-71-17-28
    use profile default-ap81xx
    use rf-domain default
    hostname ap8132-711728
    license AAP DEFAULT-LICENSE
rfs6000-81742D(config-device-B4-C7-99-71-17-28)#
```

```
rfs6000-81742D(config)#show wireless ap configured
---------------------------------------------------------------------------------------
IDX | NAME             | MAC            | PROFILE       | RF-DOMAIN | ADOPTED-BY
---------------------------------------------------------------------------------------
1   | ap8132-711728   | B4-C7-99-71-17-28 | default-ap81xx | default   | 00-15-70-81-74-2D
---------------------------------------------------------------------------------------
rfs6000-81742D(config)#
```

**Related Commands**

- `no` Removes an AP81XX from the network
4.1.18 ap82xx

Global Configuration Commands

Adds an AP82XX series to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ap82xx <MAC>

Parameters

- ap82xx <MAC>

Examples

rfs7000-37FABE(config-device-00-23-68-14-77-48)
rfs7000-37FABE(config-device-00-23-68-14-77-48)#show context
ap82xx 00-23-68-14-77-48
use profile default-ap82xx
use rf-domain default
hostname ap8232-147748
rfs7000-37FABE(config-device-00-23-68-14-77-48)#
rfs7000-37FABE(config)#show wireless ap configured
---------------------------------------------------------------------------------------
IDX | NAME                | MAC              | PROFILE       | RF-DOMAIN | ADOPTED-BY   
---------------------------------------------------------------------------------------
 1  | ap621-E3C356        | 5C-0E-8B-E3-C3-56 | default-ap621 | default   | un-adopted   
 2  | ap622-43C3DC        | B4-C7-99-43-C3-DC | default-ap622 | default   | un-adopted   
 3  | ap650-3481BC        | 5C-0E-8B-34-81-BC | default-ap650 | default   | un-adopted   
 4  | ap6511-08456A       | 5C-0E-8B-08-45-6A | default-ap6511| default   | un-adopted   
 5  | ap8232-147748       | 00-23-68-14-77-48 | default-ap82xx| default   | un-adopted   
---------------------------------------------------------------------------------------
rfs7000-37FABE(config)#

Related Commands

no

Removes an AP82XX from the network
4.1.19 ap8432

Global Configuration Commands

Adds an AP8432 series to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ap8432 <MAC>

Parameters

- ap8432 <MAC>

Examples

nx9500-6C8809(config)#ap8432 84-24-8D-80-C2-AC
nx9500-6C8809(config-device-84-24-8D-80-C2-AC)#show context
ap8432 84-24-8D-80-C2-AC
use profile default-ap8432
use rf-domain default
hostname ap8432-80C2AC
nx9500-6C8809(config-device-84-24-8D-80-C2-AC)#

nx9500-6C8809(config)#show wireless ap configured

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap8432-80C2AC</td>
<td>84-24-8D-80-C2-AC</td>
<td>default-ap8432</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

Related Commands

no

Removes an AP8432 from the network
4.1.20  ap8533

▶ Global Configuration Commands

Adds an AP8533 series to the network. If a profile for the AP is not available, a new profile is created.

Supported in the following platforms:

• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ap8533 <MAC>

Parameters

• ap8533 <MAC>

<table>
<thead>
<tr>
<th>&lt;MAC&gt;</th>
<th>Specify the AP8533’s MAC address.</th>
</tr>
</thead>
</table>

Examples

nx9500-6C8809(config)#ap8533 B4-C7-99-74-B4-5C
nx9500-6C8809(config-device-B4-C7-99-74-B4-5C)#show context
ap8533 B4-C7-99-74-B4-5C
use profile default-ap8533
use rf-domain default
hostname ap8533-74B45C

nx9500-6C8809(config)#show wireless ap configured

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap8533-74B45C</td>
<td>B4-C7-99-74-B4-5C</td>
<td>default-ap8533</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

nx9500-6C8809(config)#

Related Commands

no

Removes an AP8533 from the network
4.1.21 application

Global Configuration Commands

The following table lists the commands that enable you to enter the Application definition configuration mode:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>application</td>
<td>Creates a new application definition and enters its configuration mode. This command allows you to create a customized application detection definition.</td>
<td>page 4-37</td>
</tr>
<tr>
<td>application-config-mode commands</td>
<td>Summarizes application definition configuration mode commands.</td>
<td>page 4-39</td>
</tr>
</tbody>
</table>
4.1.21.1 application

Creates a new application definition and enters its configuration mode. This command allows you to create a customized application recognition definition.

The WiNG software uses Protocol and Application Classification Engine (PACE), a third-party Deep Packet Inspection (DPI) engine from IPOQUE, to enable application recognition. When enabled, the PACE evaluation package inspects network traffic to determine the application/protocol type. It can detect common HTTP-based applications (for example, Youtube and Facebook), enterprise-based applications (for example, Lync and Webex), and peer-to-peer applications (for example Facetime and Bittorrent) in the network’s traffic. PACE uses a range of DPI technologies to identify approximately 700 built-in applications that are grouped into twenty two (22) application categories. You can use this command to add applications not included in the PACE package.

Application recognition can be used as a filter to classify packets based on their application/protocol type. Once classified, an action is applied, such as deny, allow, mark, or rate-limit on the packet. These actions are defined in an application policy. Therefore, an application policy, like an Access Control List (ACL), is a set of rules that control traffic within the managed network. The match criteria, used by the application policy, are the built-in PACE app-categories and/or the customized applications configured here.

**NOTE:** The PACE DPI engine has to be enabled to trigger application recognition. To enable DPI, in the device or profile configuration mode, execute the dpi command. To enable customized application detection, in the device/profile configuration mode execute the dpi > custom-app <APPLICATION-NAME> command. For more information, see dpi.

**NOTE:** To enable application recognition based traffic control, apply this application or PACE app-categories to an application policy, and use the policy with the RADIUS user authentication process, user role, WLAN, or bridge VLAN. For more information, see application-policy.

Supported in the following platforms:
- Access Points — AP7522, AP7532, AP7562
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

application <APPLICATION-NAME>

**Parameters**

- application <APPLICATION-NAME>

<table>
<thead>
<tr>
<th><strong>application &lt;APPLICATION-NAME&gt;</strong></th>
<th>Creates a new application definition and enters its configuration mode</th>
</tr>
</thead>
</table>
Examples

nx9500-6C8809(config)#application Bing
nx9500-6C8809(config-application-Bing)#?

Application Mode commands:

- **app-category**: Set application category (default is custom)
- **description**: Add application description
- **https**: Secure HTTP
- **no**: Negate a command or set its defaults
- **use**: Set setting to use

- **clrscr**: Clears the display screen
- **commit**: Commit all changes made in this session
- **do**: Run commands from Exec mode
- **end**: End current mode and change to EXEC mode
- **exit**: End current mode and down to previous mode
- **help**: Description of the interactive help system
- **revert**: Revert changes
- **service**: Service Commands
- **show**: Show running system information
- **write**: Write running configuration to memory or terminal

nx9500-6C8809(config-application-Bing)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Deletes an existing application definition</td>
</tr>
</tbody>
</table>
4.1.21.2 application-config-mode commands

The following table summarizes Application definition configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>app-category</td>
<td>Configures the category for this application definition</td>
<td>page 4-40</td>
</tr>
<tr>
<td>description</td>
<td>Configures a description for this application definition</td>
<td>page 4-41</td>
</tr>
<tr>
<td>https</td>
<td>Configures the HTTPS common-name attribute value for this application category's server certificate. Applicable only to applications using HTTPS protocol.</td>
<td>page 4-42</td>
</tr>
<tr>
<td>use</td>
<td>Associates a network-service alias or a URL list with this application definition. Applicable for applications using protocols other than HTTPS.</td>
<td>page 4-43</td>
</tr>
<tr>
<td>no</td>
<td>Removes or resets this application definition's configured settings</td>
<td>page 4-44</td>
</tr>
</tbody>
</table>
4.1.21.2.1  app-category

application-config-mode commands

Configures the category for this application definition

Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
app-category <APP-CATEGORY-NAME>

Parameters
- app-category <APP-CATEGORY-NAME>

<table>
<thead>
<tr>
<th>app-category &lt;APP-CATEGORY-NAME&gt;</th>
<th>Select the category best suited for this application definition. There are twenty three categories. These are: antivirus\ update, audio, business, conference, custom, database, file transfer, gaming, generic, im, mail, mobile, network\ management, other, p2p, remote\ control, social\ networking, standard, streaming, tunnel, video, voip, and Web. Note: The default setting is custom.</th>
</tr>
</thead>
</table>

Examples
nx9500-6C8809(config-application-Bing)#app-category antivirus\ update [TAB]
| antivirus\ update | audio | business |
| conference         | custom | database |
| filetransfer       | gaming | generic |
| im                 | mail   | mobile   |
| network\ management| other | p2p      |
| remote\ control    | social\ networking | standard |
| streaming          | tunnel | video    |
| voip               | web    |

nx9500-6C8809(config-application-Bing)#
nx9500-6C8809(config-application-Bing)#app-category streaming

Related Commands
- no
  Resets application category to default (custom)
### 4.1.21.2.2 description

**application-config-mode commands**

Configures a description for this application definition

Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

description <WORD>

**Parameters**

- **description <WORD>**

<table>
<thead>
<tr>
<th>description &lt;WORD&gt;</th>
<th>Configures a description for this application</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;WORD&gt; – Specify a description not exceeding 80 characters in length. Enter the descriptive text within double quotes.</td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C8809(config-application-Bing)#description "Bing is Microsoft's Web search engine"

nx9500-6C8809(config-application-Bing)#show context application Bing  
  description "Bing is Microsoft's Web search engine"  
  app-category streaming

nx9500-6C8809(config-application-Bing)#

**Related Commands**

- **no** | Removes this description configured for this application |
### 4.1.21.2.3 https

**application-config-mode commands**

Configures the HTTPS common-name attribute value for this application category’s server certificate

Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`https server-cert common-name [contains|ends-with] <WORD>`

**Parameters**

- `https server-cert common-name [contains|ends-with] <WORD>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>https server-cert</td>
<td>Configures the HTTPS common-name attribute value for this application category’s server certificate</td>
</tr>
</tbody>
</table>
| common-name [contains|ends-with] <WORD> | Configures the HTTPS common-name attribute value match criteria. Use one of the following options:  
- contains – Filters applications having common-name attributes containing the string specified here  
- ends-with – Filters applications ending with the string specified here  
- <WORD> – Specify the string to match. |

**Examples**

```bash
nx9500-6C8809(config-application-Bing)#https server-cert common-name exact bing.com

nx9500-6C8809(config-application-Bing)#show context
application Bing
  description "Bing is Microsoft's web search engine"
  app-category streaming
  https server-cert common-name exact bing.com

nx9500-6C8809(config-application-Bing)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the HTTPS common-name attribute value configured with this application category</td>
</tr>
</tbody>
</table>
4.1.21.2.4 use

application-config-mode commands

Associates a network-service alias or a URL list with this application definition

For applications using protocols other than HTTPS, use this command to define the protocols, ports, and/or URL host name to match.

Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

use [network-service <NETWORK-SERVICE-ALIAS-NAME>|url-list <URL-LIST-NAME>]

Parameters
- use [network-service <NETWORK-SERVICE-ALIAS-NAME>|url-list <URL-LIST-NAME>]

<table>
<thead>
<tr>
<th>use</th>
<th>Configures this application definition to use a network-service alias or a URL list</th>
</tr>
</thead>
<tbody>
<tr>
<td>network-service</td>
<td>Associates a network-service alias with this application definition</td>
</tr>
<tr>
<td>&lt;NETWORK-SERVICE-ALIAS-NAME&gt;</td>
<td>• &lt;NETWORK-SERVICE-ALIAS-NAME&gt; – Specify the network-service alias name (should be existing and configured). The network-service alias should specify the protocols and ports to match.</td>
</tr>
<tr>
<td>url-list</td>
<td>Associates a URL list with this application definition</td>
</tr>
<tr>
<td>&lt;URL-LIST-NAME&gt;</td>
<td>• &lt;URL-LIST-NAME&gt; – Specify the URL list name (should be existing and configured). The URL list should specify the HTTP URL host names to match.</td>
</tr>
</tbody>
</table>

Examples

nx9500-6C8809(config-application-Bing)#use url-list Bing

nx9500-6C8809(config-application-Bing)#show context application Bing
description "Bing is Microsoft's web search engine"
app-category streaming
use url-list Bing
https server-cert common-name exact bing.com
nx9500-6C8809(config-application-Bing)#

Related Commands
- no
  Removes the network-service alias or the URL list associated with this application definition
4.1.21.2.5 no

* application-config-mode commands

Removes or resets this application definition’s configured settings
Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

- no [app-category|description|https|use]
- no [app-category|description]
- no https server-cert common-name [contains|ends-with] <WORD>
- no use [network-service <NETWORK-SERVICE-ALIAS-NAME>|url-list <URL-LIST-NAME>]

**Parameters**

- no <PARAMETERS>

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes or resets this application definition’s configured settings based on the parameters passed</th>
</tr>
</thead>
</table>

**Examples**

The following example displays the application definition ‘Bing’ parameters before the ‘no’ commands are executed:

```
nx9500-6C8809(config-application-Bing)#show context
application Bing
description "Bing is Microsoft's web search engine"
app-category streaming
use url-list Bing
https server-cert common-name exact bing.com
```

```
nx9500-6C8809(config-application-Bing)#no description
```

```
nx9500-6C8809(config-application-Bing)#no https server-cert common-name exact bing.com
```

The following example displays the application definition ‘Bing’ parameters before the ‘no’ commands are executed:

```
nx9500-6C8809(config-application-Bing)#show context
application Bing
app-category streaming
use url-list Bing
```

```
nx9500-6C8809(config-application-Bing)#
```
4.1.22 application-policy

The following table lists the commands that enable you to enter the Application policy configuration mode:

Table 4.4 Application-Policy Config Command

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>application-policy</td>
<td>Creates an application policy and enters its configuration mode</td>
<td>page 4-46</td>
</tr>
<tr>
<td>application-policy-mode commands</td>
<td>Summarizes the application policy configuration mode commands</td>
<td>page 4-48</td>
</tr>
</tbody>
</table>
4.1.22.1 application-policy

Create an application policy and enters its configuration mode.

An application policy defines actions to be executed on recognized HTTP (Facebook), enterprise (Webex) and peer-to-peer (gaming) applications or application categories. These rules are numbered and are applied to each packet sequentially in increasing order of their precedence number. Once a match is made, the packet is either forwarded, dropped, marked, or rate limited depending on the action specified in that rule.

Application recognition is the key to application-based traffic control and prioritization within a managed network. The WiNG software uses PACE, a third-party DPI engine from IPOQUE, to enable application recognition. When enabled, PACE uses various DPI technologies to identify a range of applications that include Web-based and other difficult-to-classify protocols utilizing dynamic TCP/UDP port assignments. When an application is recognized and classified, a pre-defined application policy invokes appropriate action for that specific application. PACE provides a default database of application definitions (approximately 700 canned application signatures). In addition, to these, there is a provision to add new customized application definitions. You can also customize the default, canned application definitions.

Once created and configured, apply the application policy to the following levels within the network to enforce application assurance:

- RADIUS CoA usage – In the device/profile configuration mode, use the `application-policy > radius > <APPLICATION-POLICY-NAME>` command to apply the policy to every user successfully authenticated by the RADIUS server.
- User role – In the role-policy-user-role configuration mode, use the `use > application-policy <APPLICATION-POLICY-NAME>` command to apply the policy to all users assigned to the role.
- WLAN – In the WLAN configuration mode, use the `use > application-policy <APPLICATION-POLICY-NAME>` command to apply the policy to all users accessing the WLAN.
- Bridge VLAN – In the bridge VLAN configuration mode, use the `use > application-policy <APPLICATION-POLICY-NAME>` command to apply the policy for the traffic corresponding to the bridged VLAN.

Supported in the following platforms:

- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`application-policy <APPLICATION-POLICY-NAME>`

Parameters

- `application-policy <APPLICATION-POLICY-NAME>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>application-policy &lt;APPLICATION-POLICY-NAME&gt;</code></td>
<td>Specify the application policy name. If an application policy with the specified name does not exist, it is created. The name should not exceed 32 characters in length.</td>
</tr>
</tbody>
</table>
Examples

nx9500-6C8809(config)#application-policy TestAppliPolicy
nx9500-6C8809(config-app-policy-TestAppliPolicy)#?

Application Policy Mode commands:
- allow: Allow packets
- deny: Deny packets
- description: Application policy description
- enforcement-time: Configure policy enforcement based on time
- logging: Application recognition logging
- mark: Mark packets
- no: Negate a command or set its defaults
- rate-limit: Rate-limit packets
- clrscr: Clears the display screen
- commit: Commit all changes made in this session
- do: Run commands from Exec mode
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
- help: Description of the interactive help system
- revert: Revert changes
- service: Service Commands
- show: Show running system information
- write: Write running configuration to memory or terminal

nx9500-6C8809(config-app-policy-TestAppliPolicy)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes an existing application policy</td>
</tr>
</tbody>
</table>
4.1.22.2 application-policy-mode commands

The following table summarizes Application policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>allow</td>
<td>Creates an allow rule and configures the match criteria based on which packets are filtered and the allow access action applied</td>
<td>page 4-49</td>
</tr>
<tr>
<td>deny</td>
<td>Creates a deny rule and configures the match criteria based on which packets are filtered and the deny access action applied</td>
<td>page 4-52</td>
</tr>
<tr>
<td>description</td>
<td>Configures a brief description for this application policy that enables you to differentiate it from other application policies</td>
<td>page 4-55</td>
</tr>
<tr>
<td>enforcement-time</td>
<td>Configures an enforcement time period in days and hours for this application policy. The policy is enforced only during the specified time period.</td>
<td>page 4-56</td>
</tr>
<tr>
<td>logging</td>
<td>Enables logging of application recognition hits made by the PACE DPI engine. It also sets the logging level.</td>
<td>page 4-58</td>
</tr>
<tr>
<td>mark</td>
<td>Creates a mark rule and configures the match criteria based on which packets are filtered and marked with 802.1p priority value or Differentiated Service Code Point (DSCP) code</td>
<td>page 4-59</td>
</tr>
<tr>
<td>rate-limit</td>
<td>Creates a rate-limit rule and configures the match criteria based on which incoming and outgoing packets are filtered and the configured rate limits applied</td>
<td>page 4-62</td>
</tr>
<tr>
<td>no</td>
<td>Removes or resets this application policy’s settings</td>
<td>page 4-65</td>
</tr>
</tbody>
</table>
### 4.1.22.2.1 allow

**application-policy-mode commands**

Creates an allow rule and configures the match criteria based on which packets are filtered and the allow access action applied.

Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
allow [app-category [<APP-CATEGORY-NAME>|all]|application <APPLICATION-NAME>]
schedule <SCHEDULE-POLICY-NAME> (precedence <1-256>)
```

**Parameters**

- **allow [app-category [<APP-CATEGORY-NAME>|all]|application <APPLICATION-NAME>]**
  - Uses application category as the match criteria
    - `<APP-CATEGORY-NAME>` – Specify the application category. The options are:
      - antivirus\ update, audio, business, conference, custom, database, file transfer, gaming, generic, im, mail, mobile, network\ management, other, p2p, remote\_control, social\ networking, standard, streaming, tunnel, video, voip, and web. Each packet’s app-category is matched with the value specified here. In case of a match, the system forwards the packet or else drops it.
    - `all` – The system forwards all packets irrespective of the application category.

- **application <APPLICATION-NAME>**
  - Uses application name as the match criteria
    - `<APPLICATION-NAME>` – Specify the application name. Each packet’s application is matched with the application name specified here. In case of a match, the system forwards the packet.

**Note:** The WiNG database provides approximately 381 canned applications. In addition to these, the database also includes custom-made applications. These are application definitions created using the `application` command.

- **schedule <SCHEDULE-POLICY-NAME> (precedence <1-256>)**
  - Schedules an enforcement time for this allow rule by associating a schedule policy with it. Use this parameter to apply rule-specific enforcement time.
    - `schedule <SCHEDULE-POLICY-NAME>` – Associates a schedule policy with the rule. When associated, the rule is enforced only on the days and time configured in the schedule policy. Without the association of a schedule policy, all rules within an application policy are enforced at the same time (defined by the `application-policy > enforcement-time` command). If scheduling a rule, ensure that the time configured in the schedule policy is a subset of the application policy’s enforcement time. In other words the application policy should be active when the rule is being enforced. For example, if the application policy is enforced on Mondays from 10:00 to 22:00 hours and the schedule policy time-rule is set for Fridays, then this rule will never be hit. When enforcing rules at different times the best practice would be to keep the application policy active at all time (i.e., retain the default enforcement-time setting as ‘all’).
    - `<SCHEDULE-POLICY-NAME>` – Specify the policy name (should be existing and configured). After applying a schedule policy, specify a precedence for the rule.

**Note:** In case of no schedule policy being applied, the rule is enforced as per the enforcement-time configured in the application policy. For more information, see `enforcement-time`. 
Examples

The following examples show two allow rules, allowing access to all packets belonging to the application category 'business' and the application 'Bing':

```
nx9500-6C8809(config-app-policy-Bing)#allow application Bing [TAB]
Bing BitTorrent BitTorrent_encrypted
BitTorrent_plain BitTorrent_uTP BitTorrent_uTP_encrypted
```

**Note:** Bing is not one of the WiNG built-in database applications. It is a customized application created using the `application` command.

```
nx9500-6C8809(config-app-policy-Bing)#allow application Bing precedence 1
```

```
nx9500-6C8809(config-app-policy-Bing)#allow app-category [TAB]
all antivirus\ update audio
business conference custom
database filetransfer gaming
generic im mail
mobile network\ management other
p2p remote_control social\ networking
standard streaming tunnel
video voip web
```

**Note:** Bing is not one of the WiNG built-in database applications. It is a customized application created using the `application` command.

```
nx9500-6C8809(config-app-policy-Bing)#allow app-category business precedence 2
```

```
nx9500-6C8809(config-app-policy-Bing)#show context application-policy Bing
allow application Bing precedence 1
allow app-category business precedence 2
```

**Note:** Bing is not one of the WiNG built-in database applications. It is a customized application created using the `application` command.

```
nx9500-6C8809(config-app-policy-Bing)#allow application Bing precedence 1
```

```
nx9500-6C8809(config-app-policy-Bing)#deny app-category streaming precedence 2
```

The following configuration is incorrect:

```
nx9500-6C8809(config-app-policy-Bing)#deny app-category streaming precedence 1
```

```
nx9500-6C8809(config-app-policy-Bing)#allow application Bing precedence 2
```

Once the deny app-category streaming precedence 1 rule is hit, all streaming packets, including youtube, are dropped. Consequently, there are no packets left to apply the subsequent allow rule.

**Note:** The mark and rate-limit rules are the only two actions that can be combined for a specific application or application category type.
The following example shows an application policy 'SocialNet' having an allow rule with an associated schedule policy named 'Faceook':

```
nx9500-6C8809(config-app-policy-SocialNet)#allow application facebook schedule Facebook precedence 1
```

```
nx9500-6C8809(config-app-policy-SocialNet)#show context
application-policy SocialNet
  description "This application policy relates to Social Networking sites."
  allow application facebook schedule Facebook precedence 1
nx9500-6C8809(config-app-policy-SocialNet)#
```

The schedule policy 'FaceBook' configuration as follows. As per this policy, the above allow rule will apply to all FaceBook packets every Friday between 13:00 and 18:00 hours.

```
nx9500-6C8809(config-schedule-policy-FaceBook)#show context
schedule-policy FaceBook
  description "Allows FaceBook traffic on Fridays."
  time-rule days friday start-time 13:00 end-time 18:00
nx9500-6C8809(config-schedule-policy-FaceBook)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes this allow rule from the application policy</td>
</tr>
</tbody>
</table>
### 4.1.22.2.2 deny

**application-policy-mode commands**

Creates a deny rule and configures the match criteria based on which packets are filtered and the deny access action applied.

**Syntax**

```plaintext
deny [app-category [<APP-CATEGORY-NAME>|all]|application <APPLICATION-NAME>]
schedule <SCHEDULE-POLICY-NAME> (precedence <1-256>)
```

**Parameters**

- `deny [app-category [<APP-CATEGORY-NAME>|all]|application <APPLICATION-NAME>]` creates a deny rule and configures the match criteria. The options are `app-category` and `application`.
  - `app-category` specifies the application category as the match criteria. The options are:
    - `<APP-CATEGORY-NAME>` – Specifies the application category name. The options are: antivirus\update, audio, business, conference, custom, database, file transfer, gaming, generic, im, mail, mobile, network\management, other, p2p, remote\control, social\networking, standard, streaming, tunnel, video, voip, and web. Each packet’s app-category is matched with the value specified here. In case of a match, the system drops the packet.
    - `all` – The system drops all packets irrespective of the application category.
  - `application` specifies the application name as the match criteria. The options are:
    - `<APPLICATION-NAME>` – Specifies the application name. Each packet’s application is matched with the application name specified here. In case of a match, the system drops the packet.

- `schedule <SCHEDULE-POLICY-NAME> (precedence <1-256>)` associates a schedule policy with the rule. It is used to specify the enforcement time for this deny rule by associating a schedule policy with it.
  - `<SCHEDULE-POLICY-NAME>` specifies the policy name (should be existing and configured).

**Note:** There are approximately some 381 canned applications in the database. In addition to these, the database displays custom-made applications also. These are application definitions created using the `application` command.
Examples

The following example shows one deny rule, denying access to all packets belonging to the application category 'social\ networking':

```
x9500-6C8809(config-app-policy-Bing)#den
```
nx9500-6C8809(config-app-policy-SocialNet)#show context
application-policy SocialNet
description "This application policy relates to Social Networking sites."
allow application facebook schedule FaceBook precedence 1
deny app-category "social networking" schedule DenyS-N precedence 2
nx9500-6C8809(config-app-policy-SocialNet)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes this deny rule from the application policy</td>
</tr>
</tbody>
</table>
4.1.22.2.3 **description**

*application-policy-mode commands*

Configures a brief description for this application policy that enables you to differentiate it from other application policies.

Supported in the following platforms:

- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

description <LINE>

**Parameters**

- description <LINE>

<table>
<thead>
<tr>
<th>description &lt;LINE&gt;</th>
<th>Configures this application policy’s description</th>
</tr>
</thead>
<tbody>
<tr>
<td>- &lt;LINE&gt;</td>
<td>- Specify a brief description not exceeding 80 characters in length.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-app-policy-Bing)#description "This application policy allows Bing search engine packets"
nx9500-6C8809(config-app-policy-Bing)#show context application-policy Bing
description "This application policy allows Bing search engine packets"
allow application Bing precedence 1
allow app-category business precedence 2
deny app-category "social networking" precedence 3
nx9500-6C8809(config-app-policy-Bing)#
```

**Related Commands**

- **no** Removes this application policy’s description
4.1.22.2.4 enforcement-time

> application-policy-mode commands

Configures an enforcement time period in days and hours for this application policy. The enforcement time is applicable only to those rules, within the application policy, that do not have a schedule policy associated. By default an application policy is enforced on all days.

**NOTE:** Schedule policies are a means of enforcing allow/deny/mark/rate-limit rules at different time periods. If no schedule policy is applied, all rules within an application policy are enforced at the time specified using this enforcement-time command. For more information on configuring a schedule policy, see schedule-policy.

---

Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
enforcement-time days [sunday|monday|tuesday|wednesday|thursday|friday|saturday|all|weekends|weekdays] {start-time <HH:MM> end-time <HH:MM>
```

**Parameters**

- **enforcement-time days [sunday|monday|tuesday|wednesday|thursday|friday|saturday|all|weekends|weekdays] {start-time <HH:MM> end-time <HH:MM>}**

---

<table>
<thead>
<tr>
<th>enforcement-time days</th>
<th>Enforces this application policy on only the days specified here</th>
</tr>
</thead>
<tbody>
<tr>
<td>• sunday –</td>
<td>Enforces the policy only on Sundays</td>
</tr>
<tr>
<td>• monday –</td>
<td>Enforces the policy only on Mondays</td>
</tr>
<tr>
<td>• tuesday –</td>
<td>Enforces the policy only on Tuesdays</td>
</tr>
<tr>
<td>• wednesday –</td>
<td>Enforces the policy only on Wednesdays</td>
</tr>
<tr>
<td>• thursday –</td>
<td>Enforces the policy only on Thursdays</td>
</tr>
<tr>
<td>• friday –</td>
<td>Enforces the policy only on Fridays</td>
</tr>
<tr>
<td>• saturday –</td>
<td>Enforces the policy only on Saturdays</td>
</tr>
<tr>
<td>• all –</td>
<td>Enforces the policy on all days. This is the default setting.</td>
</tr>
<tr>
<td>• weekends –</td>
<td>Enforces the policy only on weekends</td>
</tr>
<tr>
<td>• weekdays –</td>
<td>Enforces the policy only on weekdays</td>
</tr>
</tbody>
</table>

**Note:** In case no enforcement time is specified, the application policy is enforced on all days (i.e., always active).

**Note:** If using schedule policies with the allow/deny/mark/rate-limit rules, the best practice would be to keep the application policy active at all time (i.e., retain the default enforcement-time setting of ‘all’).

<table>
<thead>
<tr>
<th>start-time <a href="">HH:MM</a> end-time <a href="">HH:MM</a></th>
<th>Optional. Configures this application policy’s enforcement period</th>
</tr>
</thead>
<tbody>
<tr>
<td>• start-time –</td>
<td>Configures the start time. This is the time at which the application policy enforcement begins.</td>
</tr>
<tr>
<td>• end-time –</td>
<td>Configures the end time. This is the time at which the application policy enforcement ends.</td>
</tr>
<tr>
<td>• <a href="">HH:MM</a> –</td>
<td>Specify the start and end time in the HH:MM format.</td>
</tr>
</tbody>
</table>
Examples

nx9500-6C8809(config-app-policy-Bing)#enforcement-time days weekdays start-time 10:30 end-time 20:00

nx9500-6C8809(config-app-policy-Bing)#show context application-policy Bing
description "This application policy allows Bing search engine packets"
enforcement-time days weekdays start-time 10:30 end-time 20:00
allow application Bing precedence 1
deny app-category "social networking" precedence 3
nx9500-6C8809(config-app-policy-Bing)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes this application policy's enforcement period</td>
</tr>
</tbody>
</table>
4.1.22.2.5 logging

*application-policy-mode commands*

Enables logging of application recognition hits made by the PACE DPI engine. It also sets the logging level.

Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
logging [level|on]
logging on
logging level [<0-7>|alerts|critical|debugging|emergencies|errors|informational|notifications|warnings]
```

**Parameters**

- **logging on**
  - Enables logging of application recognition hits made by the PACE DPI engine. This option is disabled by default.
  
- **logging level [<0-7>|alerts|critical|debugging|emergencies|errors|informational|notifications|warnings]**
  - Sets the logging level for application recognition hits made by the PACE DPI engine. This option is disabled by default.
    - `<0-7>` – Sets the message logging severity level on a scale of 0 - 7
    - `emergencies` – Severity level 0: System is unusable
    - `alerts` – Severity level 1: Requires immediate action
    - `critical` – Severity level 2: Critical conditions
    - `errors` – Severity level 3: Error conditions
    - `warnings` – Severity level 4: Warning conditions
    - `notifications` – Severity level 5: Normal but significant conditions (this is the default setting)
    - `informational` – Severity level 6: Informational messages
    - `debugging` – Severity level 7: Debugging messages

**Examples**

```
nx9500-6C8809(config-app-policy-Bing)#logging level critical
nx9500-6C8809(config-app-policy-Bing)#show context application-policy Bing
description "This application policy allows Bing search engine packets"
  enforcement-time days weekdays start-time 12:30 end-time 20:00
  allow application Bing precedence 1
  allow app-category business precedence 2
  deny app-category "social networking" precedence 3
  logging level critical
nx9500-6C8809(config-app-policy-Bing)#
```

**Related Commands**

```
no
```

- Resets the logging level to default (notifications). And the `no > logging > on` command disables DPI logging.
### 4.1.22.2.6 mark

<table>
<thead>
<tr>
<th><strong>application-policy-mode commands</strong></th>
</tr>
</thead>
</table>

Creates a mark rule and configures the match criteria based on which packets are marked

Marks packets, matching a specified set of application categories or applications/protocols, with 802.1p priority level or *Differentiated Services Code Point (DSCP) type of service* (ToS) code. Marking packets is a means of identifying them for specific actions, and is used to provide different levels of service to different traffic types.

Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX7500, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
mark [app-category [<APP-CATEGORY-NAME>|all]|application <APPLICATION-NAME>]
[8021p <0-7]|dscp <0-63> schedule <SCHEDULE-POLICY-NAME> (precedence <1-256>)
```

#### Parameters

- **mark [app-category [<APP-CATEGORY-NAME>|all]|application <APPLICATION-NAME>]
  [8021p <0-7]|dscp <0-63> schedule <SCHEDULE-POLICY-NAME> (precedence <1-256>)**

<table>
<thead>
<tr>
<th><strong>mark</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Creates a mark rule and configures the match criteria. When applied, the rule marks packets, matching the criteria configured here, with 802.1p priority value or DSCP code. The match criteria options are: app-category and application.</td>
</tr>
</tbody>
</table>

| **app-category [<APP-CATEGORY-NAME>|all]** |
|------------------------------------------|
| Uses application category as the match criteria |
| - `<APP-CATEGORY-NAME>` – Specify the application category. The options are: antivirus\ update, audio, business, conference, custom, database, file transfer, gaming, generic, im, mail, mobile, network\ management, other, p2p, remote_control, social\ networking, standard, streaming, tunnel, video, voip, and web. Each packet’s app-category is matched with the value specified here. In case of a match, the system marks the packet. |
| - all – The system marks all packets irrespective of the application category. |

<table>
<thead>
<tr>
<th><strong>application &lt;APPLICATION-NAME&gt;</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses application name as the match criteria</td>
</tr>
<tr>
<td>- <code>&lt;APPLICATION-NAME&gt;</code> – Specify the application name. Each packet’s application is matched with the application name specified here. In case of a match, the system marks the packet.</td>
</tr>
</tbody>
</table>

**Note:** The WING database provides approximately 381 canned applications. In addition to these, the database includes custom-made applications. These are application definitions created using the `application` command.

<table>
<thead>
<tr>
<th><strong>8021p &lt;0-7&gt;</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks packets matching the specified criteria with 802.1p priority value</td>
</tr>
<tr>
<td>- <code>&lt;0-7&gt;</code> – Specify a value from 0 - 7.</td>
</tr>
</tbody>
</table>

**Note:** The IEEE 802.1p signaling standard enables marking of layer 2 network traffic. Layer 2 network devices (such as switches), using 802.1p standards, group traffic into classes based on their 802.1p priority value, which is appended to the packet’s MAC header. In case of traffic congestion, packets with higher priority get precedence over lower priority packets and are forwarded first.

<table>
<thead>
<tr>
<th><strong>dscp &lt;0-63&gt;</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks packets matching the specified criteria with DSCP ToS code</td>
</tr>
<tr>
<td>- <code>&lt;0-63&gt;</code> – Specify a value from 0 - 63.</td>
</tr>
</tbody>
</table>

**Note:** The DSCP protocol marks layer 3 network traffic. Layer 3 network devices (such as routers) using DSCP, mark each layer 3 packet with a six-bit DSCP code, which is appended to the packet’s IP header. Each DSCP code is assigned a corresponding level of service, enabling packet prioritization.
**Examples**

nx9500-6C8809(config-app-policy-Bing)#mark app-category video dscp 9 precedence 4

nx9500-6C8809(config-app-policy-Bing)#mark application facetime dscp 10 precedence 5

nx9500-6C8809(config-app-policy-Bing)#show context
application-policy Bing
description "This application policy allows Bing search engine packets"
enforcement-time days weekdays start-time 12:30 end-time 20:00
allow application Bing precedence 1
allow app-category business precedence 2
deny app-category "social networking" precedence 3
mark app-category video dscp 9 precedence 4
mark application facetime dscp 10 precedence 5
logging level critical
nx9500-6C8809(config-app-policy-Bing)#

**schedule**

<table>
<thead>
<tr>
<th>&lt;SCHEDULE-POLICY-NAME&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedules an enforcement time for this mark rule by associating a schedule policy with it. Use this parameter to apply rule-specific enforcement time.</td>
</tr>
<tr>
<td>• schedule &lt;SCHEDULE-POLICY-NAME&gt; – Associates a schedule policy with the rule. When associated, the rule is enforced only on the days and time configured in the schedule policy. Without the association of a schedule policy, all rules within an application policy are enforced at the same time (defined by the <code>application-policy &gt; enforcement-time</code> command). If scheduling a rule, ensure that the time configured in the schedule policy is a subset of the application policy’s enforcement time. In other words the application policy should be active when the rule is being enforced. For example, if the application policy is enforced on Mondays from 10:00 to 22:00 hours and the schedule policy time-rule is set for Fridays, then this rule will never be hit. When enforcing rules at different times the best practice would be to keep the application policy active at all time (i.e., retain the default enforcement-time setting as ‘all’).</td>
</tr>
<tr>
<td>• &lt;SCHEDULE-POLICY-NAME&gt; – Specify the policy name (should be existing and configured). After applying a schedule policy, specify a precedence for the rule.</td>
</tr>
</tbody>
</table>

**precedence**

| <1-256> |
| Assigns a precedence value for this mark rule. The precedence value differentiates between rules applicable to applications and the application categories they belong. The allow, deny, mark, rate-limit options are mutually exclusive. In other words, in an application policy, for a specific application or application category, you can create either an allow rule, or a deny rule, or a mark and rate-limit rule. |
| Let us consider application `youtube` belonging to app-category `streaming`. The action required is: Allow `youtube` packets and deny all other applications belonging to app-category `streaming`. The rules can be defined as: 
  #allow application youtube precedence 1
  #deny app-category streaming precedence 2
| The following configuration is incorrect: 
  #deny app-category streaming precedence 1
  #allow application youtube precedence 2
| Once the deny app-category streaming precedence 1 rule is hit, all streaming packets, including `youtube`, are dropped. Consequently, there are no packets left to apply the subsequent allow rule. |
| Note: The mark and rate-limit rules are the only two actions that can be combined for a specific application or application category type. |
Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes this mark rule from the application policy</td>
</tr>
</tbody>
</table>
4.22.2.7 rate-limit

> application-policy-mode commands

Creates a rate-limit rule and configures the match criteria.

Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

\[
\text{rate-limit \ [app-category \ [<\text{APP-CATEGORY-NAME}|\text{all}]|application \ <\text{APPLICATION-NAME}>\] (\ [egress|ingress]\) rate \ <50-1000000> max-burst-size \ <2-1024> \ schedule \ <\text{SCHEDULE-POLICY-NAME}> \ (precedence \ <1-256>)}
\]

Parameters

- **rate-limit** [app-category [\ <\text{APP-CATEGORY-NAME}|\text{all}]|application \ <\text{APPLICATION-NAME}>\] (\ [egress|ingress]\) rate \ <50-1000000> max-burst-size \ <2-1024> \ schedule \ <\text{SCHEDULE-POLICY-NAME}> \ (precedence \ <1-256>)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>rate-limit</strong></td>
<td>Creates a rate-limit rule and configures the match criteria. When applied, the rule applies a rate-limit to packets that match the criteria configured here. These packets could be incoming, outgoing, or both. The match criteria options are: app-category and application.</td>
</tr>
<tr>
<td><strong>app-category</strong> [\ &lt;\text{APP-CATEGORY-NAME}</td>
<td>\text{all}]</td>
</tr>
<tr>
<td><strong>application</strong> &lt;\text{APPLICATION-NAME}&gt;</td>
<td>Uses application name as the match criteria.\n- \ &lt;\text{APPLICATION-NAME}&gt; – Specify the application name. Each packet’s application is matched with the application name specified here. In case of a match, the system rate-limits the packet.</td>
</tr>
<tr>
<td>\ [egress</td>
<td>ingress]\</td>
</tr>
<tr>
<td><strong>rate</strong> &lt;50-1000000&gt;</td>
<td>The following parameters are common to the ‘egress’ and ‘ingress’ keywords:\n- \ rate – Configures the rate limit, in Kbps, for both incoming and outgoing packets\n  \ - \ &lt;50-1000000&gt; – Specify the rate limit from 50 - 1000000 Kbps.</td>
</tr>
<tr>
<td><strong>max-burst-size</strong></td>
<td>The following parameters are common to the ‘egress’ and ‘ingress’ keywords:\n- \ max-burst-size – Configures the maximum burst size, in Kbytes, for both incoming and outgoing packets\n  \ - \ &lt;2-1024&gt; – Specify the maximum burst size from 2 - 1024 Kbytes.</td>
</tr>
</tbody>
</table>
Schedule a specific enforcement time for this rate-limit rule by associating a schedule policy with it. Use this parameter to apply rule-specific enforcement time.

- `schedule <SCHEDULE-POLICY-NAME>`: Associates a schedule policy with the rule. When associated, the rule is enforced only on the days and time configured in the schedule policy. Without the association of a schedule policy, all rules within an application policy are enforced at the same time (defined by the `application-policy > enforcement-time` command). If scheduling a rule, ensure that the time configured in the schedule policy is a subset of the application policy’s enforcement time. In other words, the application policy should be active when the rule is being enforced. For example, if the application policy is enforced on Mondays from 10:00 to 22:00 hours and the schedule policy time-rule is set for Fridays, then this rule will never be hit. When enforcing rules at different times, the best practice would be to keep the application policy active at all time (i.e., retain the default enforcement-time setting as ‘all’).

- `<SCHEDULE-POLICY-NAME>`: Specify the policy name (should be existing and configured). After applying a schedule policy, specify a precedence for the rule.

**Note:** In case of no schedule policy being applied, the rule is enforced as per the enforcement-time configured in the application policy. For more information, see `enforcement-time`.

Assigns a precedence value for this rate-limit rule. Assigns a precedence value between rules applicable to applications and the application categories they belong. The allow, deny, mark, rate-limit options are mutually exclusive. In other words, in an application policy, for a specific application or application category, you can create either an allow rule, or a deny rule, or a mark and rate-limit rule.

**Let us consider application youtube belonging to app-category streaming.**

The action required is: Allow `youtube` packets and deny all other applications belonging to app-category `streaming`.

The rules can be defined as:

```plaintext
#allow application youtube precedence 1
#deny app-category streaming precedence 2
```

The following configuration is incorrect:

```plaintext
#deny app-category streaming precedence 1
#allow application youtube precedence 2
```

Once the `deny` app-category streaming precedence 1 rule is hit, all streaming packets, including `youtube`, are dropped. Consequently, there are no packets left to apply the subsequent `allow` rule.

**Note:** The mark and rate-limit rules are the only two actions that can be combined for a specific application or application category type.
Examples

```bash
nx9500-6C8809(config-app-policy-Bing)#rate-limit application BGP ingress rate 100 max-burst-size 25 egress rate 50 max-burst-size 25 precedence 6
```

```bash
nx9500-6C8809(config-app-policy-Bing)#show context application-policy Bing
description "This application policy allows Bing search engine packets"
enforcement-time days weekdays start-time 12:30 end-time 20:00
allow application Bing precedence 1
allow app-category business precedence 2
deny app-category "social networking" precedence 3
mark app-category video dscp 9 precedence 4
mark application facetime dscp 10 precedence 5
rate-limit application BGP ingress rate 100 max-burst-size 25 egress rate 50 max-burst-size 25 precedence 6
logging level critical
```

```bash
nx9500-6C8809(config-app-policy-Bing)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes this rate-limit rule from the application policy</td>
</tr>
</tbody>
</table>
4.1.22.2 no

application-policy-mode commands

Removes or resets this application policy’s settings.

Supported in the following platforms:
- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [allow|deny|description|enforcement-time|logging|mark|rate-limit]

no allow [app-category [<APP-CATEGORY-NAME>|all]|application <APPLICATION-NAME>]
   precedence <1-256>

no deny [app-category [<APP-CATEGORY-NAME>|all]|application <APPLICATION-NAME>]
   precedence <1-256>

no description

no enforcement-time days [sunday|monday|tuesday|wednesday|thursday|friday|saturday|
   all|weekends|weekdays]

no logging [level|on]

no mark [app-category [<APP-CATEGORY-NAME>|all]|application <APPLICATION-NAME>]
   precedence <1-256>

no rate-limit [app-category [<APP-CATEGORY-NAME>|all]|application <APPLICATION-NAME>]
   precedence <0-256>

Parameters
- no <PARAMETERS>

Examples
The following example shows the application policy ‘Bing’ settings before the ‘no’ commands are executed:

nx9500-6C8809(config-app-policy-Bing)#show context
application-policy Bing
   description "This application policy allows Bing search engine packets"
   enforcement-time days weekdays start-time 12:30 end-time 20:00
   allow application Bing precedence 1
   allow app-category business precedence 2
   deny app-category "social networking" precedence 3
   mark app-category video dscp 9 precedence 4
   mark application facetime dscp 10 precedence 5
   rate-limit application BGP ingress rate 100 max-burst-size 25 egress rate 50 max-burst-size 25 precedence 6
   logging level critical

nx9500-6C8809(config-app-policy-Bing)#

nx9500-6C8809(config-app-policy-Bing)#no allow app-category business precedence 2
nx9500-6C8809(config-app-policy-Bing)#no deny app-category social\ networking precedence 3
The following example shows the application policy 'Bing' settings after the 'no' commands are executed:

```
nx9500-6C8809(config-app-policy-Bing)#show context
application-policy Bing
description "This application policy allows Bing search engine packets"
enforcement-time days weekdays start-time 12:30 end-time 20:00
allow application Bing precedence 1
mark app-category video dscp 9 precedence 4
mark application facetime dscp 10 precedence 5
rate-limit application BGP ingress rate 100 max-burst-size 25 egress rate 50 max-burst-size 25 precedence 6
logging level critical
nx9500-6C8809(config-app-policy-Bing)#
```
4.1.23 association-acl-policy

Global Configuration Commands

Configures an association ACL policy. This policy defines a list of devices allowed or denied access to the network.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

association-acl-policy <ASSOCIATION-ACL-POLICY-NAME>

Parameters

- association-acl-policy <ASSOCIATION-ACL-POLICY-NAME>

Examples

rfs7000-37FABE(config)#association-acl-policy test
rfs7000-37FABE(config-assoc-acl-test)#?

Association ACL Mode commands:
- deny Specify MAC addresses to be denied
- no Negate a command or set its defaults
- permit Specify MAC addresses to be permitted
- clrscr Clears the display screen
- commit Commit all changes made in this session
- do Run commands from Exec mode
- end End current mode and change to EXEC mode
- exit End current mode and down to previous mode
- help Description of the interactive help system
- revert Revert changes
- service Service Commands
- show Show running system information
- write Write running configuration to memory or terminal

rfs7000-37FABE(config-assoc-acl-test)#

Related Commands

| no | Resets values or disables commands |

NOTE: For more information on the association-acl-policy, see Chapter 10, ASSOCIATION-ACL-POLICY.
4.1.24 auto-provisioning-policy

Global Configuration Commands

Configures an auto provisioning policy. This policy configures the automatic provisioning of device adoption. The policy configures how an AP is adopted based on its type.

Supported in the following platforms:

• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

auto-provisioning-policy <AUTO-PROVISIONING-POLICY-NAME>

Parameters

- auto-provisioning-policy <AUTO-PROVISIONING-POLICY-NAME>

Examples

rfs7000-37FABE(config)#auto-provisioning-policy test
rfs7000-37FABE(config-auto-provisioning-policy-test)#?

Auto-Provisioning Policy Mode commands:

adopt Add rule for device adoption
default-adoption Adopt devices even when no matching rules are found.
Assign default profile and default rf-domain
deny Add rule to deny device adoption
evaluate-always Set the flag to evaluate the policy everytime, regardless of previous adoption status
no Negate a command or set its defaults
redirect Add rule to redirect device adoption
upgrade Add rule for device upgrade
clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
derald End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

rfs7000-37FABE(config-auto-provisioning-policy-test)#

Related Commands

no Removes an existing Auto Provisioning policy

NOTE: For more information on the association-acl-policy, see Chapter 9, AUTO-PROVISIONING-POLICY.
4.1.25 bgp

Global Configuration Commands

Configures Border Gateway Protocol (BGP) settings

BGP is an inter-ISP routing protocol which establishes routing between Internet Service Providers (ISPs). ISPs use BGP to exchange routing and reachability information between Autonomous Systems (AS) on the Internet. BGP makes routing decisions based on paths, network policies and/or rules configured by network administrators. The primary role of a BGP system is to exchange network reachability information with other BGP peers. This information includes information on AS that the reachability information traverses. This information is sufficient to create a graph of AS connectivity from which routing decisions can be created and rules enforced.

An AS is a set of routers under the same administration that use Interior Gateway Protocol (IGP) and common metrics to define how to route packets within the AS. AS uses inter-AS routing to route packets to other ASs. For an external AS, an AS appears to have a single coherent interior routing plan and presents a consistent picture of the destinations reachable through it.

Routing information exchanged through BGP supports only destination based forwarding (it assumes a router forwards packets based on the destination address carried in the IP header of the packet).

BGP uses TCP as its transport protocol. This eliminates the need to implement explicit update fragmentation, retransmission, acknowledgment, and sequencing. BGP listens on TCP port 179. The error notification mechanism used in BGP assumes that TCP supports a graceful close (all outstanding data is delivered before the connection is closed).

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

bgp [as-path-list|community-list|extcommunity-list|ip-access-list|ip-prefix-list] <LIST-NAME>

Parameters

- bgp [as-path-list|community-list|extcommunity-list|ip-access-list|ip-prefix-list] <LIST-NAME>

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>as-path-list &lt;LIST-NAME&gt;</td>
<td>Creates an AS path list and enters its configuration mode</td>
</tr>
<tr>
<td></td>
<td>• &lt;LIST-NAME&gt; – Provide the AS-PATH-LIST name.</td>
</tr>
<tr>
<td>community-list &lt;LIST-NAME&gt;</td>
<td>Creates a community list and enters its configuration mode</td>
</tr>
<tr>
<td></td>
<td>• &lt;LIST-NAME&gt; – Provide the COMMUNITY-LIST name.</td>
</tr>
<tr>
<td>extcommunity-list &lt;LIST-NAME&gt;</td>
<td>Creates an extended community list and enters its configuration mode</td>
</tr>
<tr>
<td></td>
<td>• &lt;LIST-NAME&gt; – Provide the EXTCOMMUNITY-LIST name.</td>
</tr>
<tr>
<td>ip-access-list &lt;LIST-NAME&gt;</td>
<td>Creates a BGP IP access list and enters its configuration mode</td>
</tr>
<tr>
<td></td>
<td>• &lt;LIST-NAME&gt; – Provide the BGP IP-ACCESS-LIST name.</td>
</tr>
<tr>
<td>ip-prefix-list &lt;LIST-NAME&gt;</td>
<td>Creates a BGP IP prefix list and enters its configuration mode</td>
</tr>
<tr>
<td></td>
<td>• &lt;LIST-NAME&gt; – Provide the BGP IP-PREFIX-LIST name.</td>
</tr>
</tbody>
</table>
Examples

nx4500-5CFA2B(config)#bgp ?
  as-path-list       BGP AS path list Configuration
  community-list    Add a community list entry
  extcommunity-list Add a extended community list entry (EXPERIMENTAL)
  ip-access-list    Add an access list entry
  ip-prefix-list    Build a prefix list

nx4500-5CFA2B(config)#

nx4500-5CFA2B(config)#bgp as-path-list AS-TEST-PATH
nx4500-5CFA2B(config-bgp-as-path-list-AS-TEST-PATH)#?

BGP AS Path List Mode commands:
  deny     Specify packets to reject
  no       Negate a command or set its defaults
  permit   Specify packets to forward
  clrscr   Clears the display screen
  commit   Commit all changes made in this session
  do       Run commands from Exec mode
  end      End current mode and change to EXEC mode
  exit     End current mode and down to previous mode
  help     Description of the interactive help system
  revert   Revert changes
  service  Service Commands
  show     Show running system information
  write    Write running configuration to memory or terminal

nx4500-5CFA2B(config-bgp-as-path-list-AS-TEST-PATH)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Modifies BGP settings, based on the parameters passed</td>
</tr>
</tbody>
</table>

NOTE: For more information on configuring BGP Top-Level Objects (TLOs), see Chapter 28, BORDER GATEWAY PROTOCOL.
4.1.26 bonjour-gw-discovery-policy

Bonjour is Apple's zero-configuration networking (Zeroconf) implementation. Zeroconf is a group of technologies that include service discovery, address assignment and hostname resolution. Bonjour locates the devices (printers, computers, etc.) and services these computers provide over a local network.

Bonjour provides a method to discover services on a local area network (LAN). Bonjour allows users to set up a network without any configuration. Services such as printers, scanners and file-sharing servers can be found using Bonjour. Bonjour only works within a single broadcast domain. However, with a special DNS configuration, it can be extended to find services across broadcast domains.

This command configures a Bonjour GW Discovery policy. The policy defines a list of services clients can discover across subnets. A maximum of 8 (eight) policies can be created on access points, wireless controllers, or service platforms.

When configured and applied, this feature enables discovery of Bonjour services on local and/or tunneled VLANs.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
bonjour-gw-discovery-policy <POLICY-NAME>
```

Parameters

- `bonjour-gw-discovery-policy <POLICY-NAME>`

| <POLICY-NAME> | Specify the Bonjour GW Discovery policy name. If the policy does not exist, it is created. In the Bonjour GW Discovery policy configuration mode, use the allow-service keyword to configure the services that the Bonjour gateway is allowed to discover. A maximum of 16 (sixteen) service rules can be created. Optionally, you can restrict this facility for users on specific VLANs. To do so, specify the VLAN IDs.  
  
  **Note:** Execute the `bonjour-gw-forwarding-policy` command to enable forwarding of Bonjour service responses across VLANs.  
  
  **Note:** To associate a Bonjour GW Discovery policy with a WLAN, in the WLAN configure mode, execute the following command:  
  
  `use > bonjour-gw-discovery-policy > <POLICY-NAME>` For more information, see `use`.  
  
  **Note:** To associate a Bonjour GW Discovery policy with a VLAN, in the interface VLAN configure mode, execute the following command:  
  
  `use > bonjour-gw-discovery-policy > <POLICY-NAME>` For more information, see `use`.  
  
  **Note:** To associate a Bonjour GW Discovery policy with a user role, in the role-policy - user-role config mode, execute the following command:  
  
  `use > bonjour-gw-discovery-policy > <POLICY-NAME>` For more information, see `use`.  

|
Examples

rfs7000-37FABE(config)#bonjour-gw-discovery-policy TestPolicy
rfs7000-37FABE(config-bonjour-gw-discovery-policy-TestPolicy)#?

commands:
- allow-service: Allow Bonjour Service on local or tunneled vlan, Optionally VLAN IDs can be given so service will be discovered for those vlan only
- no: Negate a command or set its defaults
- clrscr: Clears the display screen
- commit: Commit all changes made in this session
- do: Run commands from Exec mode
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
- help: Description of the interactive help system
- revert: Revert changes
- service: Service Commands
- show: Show running system information
- write: Write running configuration to memory or terminal

rfs7000-37FABE(config-bonjour-gw-discovery-policy-TestPolicy)#

Related Commands

| no | Removes an existing Bonjour GW Discovery policy |
4.1.27 bonjour-gw-forwarding-policy

Global Configuration Commands

Configures a Bonjour GW Forwarding policy. When configured and applied on the controller, the policy defines the service VLANs (the VLANs on which Bonjour services are running) and client VLANs where clients are present. All Bonjour responses from service VLANs are forwarded to client VLANs. A maximum of 2 (two) policies can be created on a wireless controller or service platform. And only 1 (one) policy can be created on an access point.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

bonjour-gw-forwarding-policy <POLICY-NAME>

Parameters

- bonjour-gw-forwarding-policy <POLICY-NAME>

<table>
<thead>
<tr>
<th>&lt;POLICY-NAME&gt;</th>
<th>Specify the Bonjour GW Forwarding policy name. If the policy does not exist, it is created.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note:</td>
<td>To receive Bonjour service responses from specific VLANs, specify the VLAN IDs. In the Bonjour GW Forwarding policy configuration mode, provide a list of VLAN IDs from which Bonjour responses can be received (format: 10-20, 25, 30-35). And then specify the list of client VLANs that can access Bonjour services.</td>
</tr>
<tr>
<td>Note:</td>
<td>Execute the bonjour-gw-discovery-policy command to define the Bonjour services allowed on local and tunneled VLANs.</td>
</tr>
<tr>
<td>Note:</td>
<td>To associate a Bonjour GW Forwarding policy with a device or profile, in the profile/device configuration mode, execute the use &gt; bonjour-gw-forwarding-policy &gt; &lt;POLICY-NAME&gt; command. For more information, see use.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config)#bonjour-gw-forwarding-policy TestPolicy
rfs7000-37FABE(config-bonjour-gw-forwarding-policy-TestPolicy)#?

commands:

<table>
<thead>
<tr>
<th>forward-bonjour-response</th>
<th>Forwards bonjour service response across vlans</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config-bonjour-gw-forwarding-policy-TestPolicy)#

Related Commands

no | Removes an existing Bonjour GW Forwarding policy
4.1.28 bonjour-gw-query-forwarding-policy

Global Configuration Commands

Configures a Bonjour GW Query Forwarding policy and enters its configuration mode. When created and applied, this policy enables forwarding of Bonjour queries across VLANs.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`bonjour-gw-query-forwarding-policy <POLICY-NAME>`

Parameters

- `bonjour-gw-query-forwarding-policy <POLICY-NAME>`

| <POLICY-NAME> | Specify the Bonjour GW Query Forwarding policy name. If the policy does not exist, it is created.
|---------------|--------------------------------------------------|
| Note: In the Bonjour GW Query Forwarding policy configuration mode, specify the ‘from’ and ‘to’ VLAN(s). The `from-vlans` option configures the VLAN(s) that are the source of the Bonjour queries. The `to-vlans` option configures the destination VLAN(s) that can access the Bonjour queries.
| Note: To associate a Bonjour GW Query Forwarding policy with a device or profile, in the profile/device configuration mode, execute the `use > bonjour-gw-query-forwarding-policy > <POLICY-NAME>` command. For more information, see `use`.

Examples

```
rs7000-37FABE(config)#bonjour-gw-query-forwarding-policy TestPolicy
rs7000-37FABE(config-bonjour-gw-query-forwarding-policy-test)#?
(config-bonjour-gw-query-forwarding-policy) commands:
  forward-bonjour-query  Forwards bonjour query across vlans
  no                     Negate a command or set its defaults
clrscr                  Clears the display screen
commit                  Commit all changes made in this session
do                      Run commands from Exec mode
end                     End current mode and change to EXEC mode
exit                    End current mode and down to previous mode
help                    Description of the interactive help system
revert                  Revert changes
service                 Service Commands
show                    Show running system information
write                   Write running configuration to memory or terminal
```

Related Commands

- `no` | Removes an existing Bonjour GW Query Forwarding policy
4.1.29 captive portal

> Global Configuration Commands

A captive portal provides secure guest access and authentication services within the network. The following table lists the commands available to enter the captive portal configuration mode:

**Table 4.6 Captive-Portal Config Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal</td>
<td>Creates a new captive portal and enters its configuration mode</td>
<td>page 4-76</td>
</tr>
<tr>
<td>captive-portal-mode commands</td>
<td>Summarizes captive portal configuration commands</td>
<td>page 4-78</td>
</tr>
</tbody>
</table>
4.1.29.1 captive-portal

A captive portal provides secure access using a standard Web browser. Captive portals provide authenticated access by capturing and re-directing a wireless user's Web browser session to a captive portal login page where the user must enter valid credentials to access to the wireless network. Once logged into the captive portal, additional Acknowledgment, Agreement, Welcome, No Service, and Fail pages provide the administrator options to customize the screen flow and user appearance.

Captive portals are recommended for providing guests or visitors authenticated access to network resources when 802.1X EAP is not a viable option. Captive portal authentication does not provide end-user data encryption, but it can be used with static WEP, WPA-PSK or WPA2-PSK encryption.

Authentication for captive portal access requests is performed using a username and password pair, authenticated by an integrated RADIUS server. Authentication for private network access is conducted either locally on the requesting wireless client, or centrally at a datacenter.

Captive portals use a Web provisioning tool to create guest user accounts directly on the controller, service platform, or access point. The connection medium defined for the Web connection is either HTTP or HTTPS. Both HTTP and HTTPS use a request and response procedure to disseminate information to and from requesting wireless clients.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

captive-portal <CAPTIVE-PORTAL-NAME>

Parameters

- captive-portal <CAPTIVE-PORTAL-NAME>

Examples

rfs7000-37FABE(config)#captive-portal test
rfs7000-37FABE(config-captive-portal-test)#?

Captive Portal Mode commands:

- access-time 
  Allowed access time for the client. Used when there is no session time in radius response
- access-type 
  Access type of this captive portal
- accounting 
  Configure how accounting records are created for this captive portal policy
- bypass 
  Bypass captive portal
- connection-mode 
  Connection mode for this captive portal
- custom-auth 
  Custom user information
- data-limit 
  Enforce data limit for clients
- inactivity-timeout
  Inactivity timeout in seconds. If a frame is not received from client for this amount of time, then current session will be removed
- ipv6 
  Internet Protocol version 6 (IPv6)
- localization 
  Configure the FQDN address to get the localization parameters for the client
- logout-fqdn 
  Configure the FQDN address to logout the session from client
- no 
  Negate a command or set its defaults
- oauth 
  OAuth 2.0 authentication configuration
- post-authentication-vlan 
  Configure post authentication vlan for captive portal users
radius-vlan-assignment  
Enable radius vlan assignment for captive portal users
redirection  
Configure connection redirection parameters
report-loyalty-application  
Report customer loyalty application presence in clients
server  
Configure captive portal server parameters
simultaneous-users  
Particular username can only be used by a certain number of MAC addresses at a time
terms-agreement  
User needs to agree for terms and conditions
use  
Set setting to use
webpage  
Configure captive portal webpage parameters
webpage-auto-upload  
Enable automatic upload of internal and advanced webpages
webpage-location  
The location of the webpages to be used for authentication. These pages can either be hosted on the system or on an external web server.
welcome-back  
Welcome back page settings
clrscr  
Cleans the display screen
commit  
Commit all changes made in this session
do  
Run commands from Exec mode
end  
End current mode and change to EXEC mode
exit  
End current mode and down to previous mode
help  
Description of the interactive help system
revert  
Revert changes
service  
Service Commands
show  
Show running system information
write  
Write running configuration to memory or terminal

rfs7000-37FABE(config-captive-portal-test)#

**Related Commands**

| no | Removes an existing captive portal |
### captive-portal-mode commands

The following table summarizes captive portal configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>access-time</td>
<td>Defines a client’s access time. It is used when no session time is defined in the RADIUS response.</td>
<td>page 4-80</td>
</tr>
<tr>
<td>access-type</td>
<td>Configures a captive portal’s access type</td>
<td>page 4-81</td>
</tr>
<tr>
<td>accounting</td>
<td>Enables a captive portal’s accounting records</td>
<td>page 4-82</td>
</tr>
<tr>
<td>bypass</td>
<td>Enables bypassing of captive portal detection requests from wireless clients</td>
<td>page 4-84</td>
</tr>
<tr>
<td>connection-mode</td>
<td>Configures a captive portal’s connection mode</td>
<td>page 4-85</td>
</tr>
<tr>
<td>custom-auth</td>
<td>Configures custom user information</td>
<td>page 4-86</td>
</tr>
<tr>
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<td>Enforces data limit on captive portal clients</td>
<td>page 4-87</td>
</tr>
<tr>
<td>inactivity-timeout</td>
<td>Defines an inactivity timeout in seconds</td>
<td>page 4-88</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures the IPv6 address of the internal captive portal server</td>
<td>page 4-89</td>
</tr>
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<td>localization</td>
<td>Configures an FQDN address string that enables the client to receive localization parameters. This command also allows the configuration of a response message.</td>
<td>page 4-90</td>
</tr>
<tr>
<td>logout-fqdn</td>
<td>Clears the logout FQDN address</td>
<td>page 4-92</td>
</tr>
<tr>
<td>no</td>
<td>Reverts the selected captive portal’s settings to default</td>
<td>page 4-93</td>
</tr>
<tr>
<td>oauth</td>
<td>Enables OAuth-based authentication support on the captive portal. When enabled, OAuth allows captive-portal users to sign in to guest WLANs using their Facebook or Google credentials.</td>
<td>page 4-95</td>
</tr>
<tr>
<td>post-authentication-vlan</td>
<td>Assigns a post authentication RADIUS VLAN for this captive portal’s users</td>
<td>page 4-96</td>
</tr>
<tr>
<td>radius-vlan-assignment</td>
<td>Assigns a RADIUS VLAN for this captive portal</td>
<td>page 4-97</td>
</tr>
<tr>
<td>redirection</td>
<td>Enables redirection of client connections to specified destination ports</td>
<td>page 4-98</td>
</tr>
<tr>
<td>report-loyalty-application</td>
<td>Enables detection of captive portal client’s loyalty application presence and stores this information in the captive portal’s user database</td>
<td>page 4-99</td>
</tr>
<tr>
<td>server</td>
<td>Configures the captive portal server settings</td>
<td>page 4-100</td>
</tr>
<tr>
<td>simultaneous-users</td>
<td>Specifies a username used by a MAC address pool</td>
<td>page 4-102</td>
</tr>
<tr>
<td>terms-agreement</td>
<td>Enforces the user to agree to terms and conditions (included in login page) for captive portal access</td>
<td>page 4-103</td>
</tr>
</tbody>
</table>
### Table 4.7 Captive-Portal-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>use</td>
<td>Associates a AAA policy and a DNS whitelist with a captive portal</td>
<td>page 4-104</td>
</tr>
<tr>
<td>webpage</td>
<td>Configures captive portal Web page settings</td>
<td>page 4-105</td>
</tr>
<tr>
<td>webpage-auto-upload</td>
<td>Enables automatic upload of advanced Web pages on a captive portal</td>
<td>page 4-113</td>
</tr>
<tr>
<td>webpage-location</td>
<td>Specifies the location of Web pages used for captive portal authentication</td>
<td>page 4-114</td>
</tr>
<tr>
<td>welcome-back</td>
<td>Enables the provision of direct Internet access to once-registered, captive-portal guest users on subsequent log-ins</td>
<td>page 4-115</td>
</tr>
<tr>
<td>configuring device registration with dynamic VLAN assignment</td>
<td>Documents configuration details required to enable device registration with dynamic VLAN assignment in a multi-vendor environment</td>
<td>page 4-116</td>
</tr>
<tr>
<td>configuring WeChat Wi-Fi hotspot support in WiNG captive portal</td>
<td>Documents configuration details required to incorporate the WeChat WiFi hotspot, so that WeChat users, on their first connect to a WiNG access point, can automatically authenticate with the WeChat server through an intermediate server</td>
<td>page 4-118</td>
</tr>
</tbody>
</table>
4.29.2.1 access-time

* captive-portal-mode commands

Defines the permitted access time for a client. It is used when no session time is defined in the RADIUS response.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

access-time <10-10080>

Parameters

- access-time <10-10080>

<table>
<thead>
<tr>
<th>access-time &lt;10-10080&gt;</th>
<th>Defines the duration wireless clients are allowed access to the Internet using this captive portal policy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;10-10080&gt; – Specify a value from 10 - 10080 minutes. The default is 1440 minutes.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-captive-portal-test)#access-time 35
rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
running captive-portal test
access-time 35
rfs7000-37FABE(config-captive-portal-test)#

Related Commands

- no
  - Reverts to the default permitted access time (1440 minutes)
### 4.1.29.2.2 access-type

* ◆ captive-portal-mode commands

Defines the captive portal’s access type. The authentication scheme configured here is applied to wireless clients using this captive portal.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
access-type [custom-auth-radius|logging|no-auth|radius|registration]
```

#### Parameters

- **access-type [custom-auth-radius|logging|no-auth|radius|registration]**

#### Examples

```
rfs7000-37FABE(config-captive-portal-test)#access-type logging
rfs7000-37FABE(config-captive-portal-test)#show context captive-portal-test
  access-type logging
  access-time 35
rfs7000-37FABE(config-captive-portal-test)#
```

#### Related Commands

- **no**

  Removes the captive portal access type or reverts to default (radius)
4.1.29.2.3 accounting

- captive-portal-mode commands

Enables support for accounting messages for this captive portal

When enabled, accounting for clients entering and exiting the captive portal is initiated. Accounting is the method of collecting and sending security server information for billing, auditing, and reporting user data. This data includes information, such as start and stop times, executed commands (such as PPP), number of packets and number of bytes transmitted, etc. Accounting enables tracking of captive portal services consumed by clients.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

accounting [radius|syslog]

accounting radius

accounting syslog host <IP/HOSTNAME> {port <1-65535>} {proxy-mode [none|through-controller|through-rf-domain-manager]}

Parameters

- accounting radius

  radius
  Enables support for RADIUS accounting messages. When enabled, this option uses an external RADIUS resource for AAA accounting. This option is disabled by default.

- accounting syslog host <IP/HOSTNAME> {port <1-65535>} {proxy-mode [none|through-controller|through-rf-domain-manager]}

  syslog
  Enables support for syslog accounting messages. When enabled, data relating to wireless client usage of remote access services is logged on the specified external syslog resource. This information assists in differentiating between local and remote users. Remote user information can be archived to an external location for periodic network and user administration. This option is disabled by default.
  - host <IP/HOSTNAME> – Specifies the destination where accounting messages are sent. Specify the destination’s IP address or hostname.

  port <1-65535>
  Optional. Specifies the syslog server’s listener port
  - <1-65535> – Specify the UDP port from 1-65535. The default is 514.

  proxy-mode [none|through-controller|through-rf-domain-manager]
  Optional. Specifies the mode of proxying the syslog server
  - none – Accounting messages are sent directly to the syslog server
  - through-controller – Accounting messages are sent through the controller configuring the device
  - through-rf-domain-manager – Accounting messages are sent through the local RF Domain manager
Examples

rfs7000-37FABE(config-captive-portal-test)#accounting syslog host 172.16.10.13 port 1

rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
  access-type logging
  access-time 35
  accounting syslog host 172.16.10.13 port 1
rfs7000-37FABE(config-captive-portal-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables accounting records for this captive portal</td>
</tr>
</tbody>
</table>
4.1.29.2.4 bypass

<table>
<thead>
<tr>
<th>captive-portal-mode commands</th>
</tr>
</thead>
</table>

Enables bypassing of captive portal detection requests from wireless clients.

Certain devices, such as Apple IOS devices send Captive Network Assistant (CNA) requests to detect existence of captive portals. When enabled, the bypass option does not allow CNA requests to be redirected to the captive portal pages.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

bypass captive-portal-detection

Parameters

- bypass captive-portal-detection

<table>
<thead>
<tr>
<th>bypass captive-portal-detection</th>
<th>Bypasses captive portal detection requests</th>
</tr>
</thead>
</table>

Examples

rfs4000-229D58(config-captive-portal-test)#bypass captive-portal-detection

rfs4000-229D58(config-captive-portal-test)#show context captive-portal test

  bypass captive-portal-detection

rfs4000-229D58(config-captive-portal-test)#

Related Commands

| no | Disables bypassing of captive portal detection requests |
4.1.29.2.5 connection-mode

Configures a captive portal’s mode of connection to the Web server. HTTP uses plain unsecured connection for user requests. HTTPS uses an encrypted connection to support user requests.

Both HTTP and HTTPS use the same Uniform Resource Identifier (URI), so controller and client resources can be identified. However, the use of HTTPS is recommended, as it affords controller and client transmissions some measure of data protection HTTP cannot provide.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
connection-mode [http|https]

Parameters
- connection-mode [http|https]

- http
  Sets HTTP as the default connection mode. This is the default setting.

- https
  Sets HTTPS as the default connection mode

Examples
rfs7000-37FABE(config-captive-portal-test)#connection-mode https
rfs7000-37FABE(config-captive-portal-test)#show context
  captive-portal test
  access-type logging
  access-time 35
  connection-mode https
  accounting syslog host 172.16.10.13 port 1
rfs7000-37FABE(config-captive-portal-test)#

Related Commands
- no
  Removes this captive portal’s connection mode
4.1.29.2.6 custom-auth

Configures custom user information

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

custom-auth info <LINE>

Parameters

- custom-auth info <LINE>

| info <LINE> | Configures information used for RADIUS lookup when custom-auth RADIUS access type is configured
|            | • <LINE> – Guest data needs to be provided. Specify the name, e-mail address, and telephone number of the user.

Examples

rfs7000-37FABE(config-captive-portal-test)#custom-auth info bob bob@examplecompany.com
rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
        access-type logging
        access-time 35
        custom-auth info bob bob@examplecompany.com
        connection-mode https
        accounting syslog host 172.16.10.13 port 1
rfs7000-37FABE(config-captive-portal-test)#

Related Commands

- **no** | Removes custom user information configured with this captive portal
4.1.29.2.7 **data-limit**

*caption-portal-mode commands*

Enforces data transfer limits on captive portal clients. This feature enables the tracking and logging of user usage. Users exceeding the allowed bandwidth are restricted from the captive portal.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
data-limit <1-102400> {action [log-and-disconnect|log-only]}
```

**Parameters**

- **data-limit <1-102400> {action [log-and-disconnect|log-only]}**

<table>
<thead>
<tr>
<th>data-limit &lt;1-102400&gt;</th>
<th>Sets a captive portal client's data transfer limit in megabytes. This limit is applicable for both upstream and downstream data transfer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-102400</td>
<td>Specify a value from 1 - 102400 MB.</td>
</tr>
</tbody>
</table>

- **action [log-and-disconnect|log-only]**

  | Optional. Specifies the action taken when a client exceeds the configured data limit. The options are: |
  | log-and-disconnect – Logs a record and disconnects the client                                                   |
  | log-only – Only a log is generated and the client remains connected to the captive portal. This is the default setting. |

**Examples**

```
rfs7000-37FABE(config-captive-portal-test)#data-limit 200 action log-and-disconnect
rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
data-limit 200 action log-and-disconnect
rfs7000-37FABE(config-captive-portal-test)#
```

**Related Commands**

- **no** Removes data limit enforcement for captive portal clients
4.1.29.2.8 inactivity-timeout

* [captive-portal-mode commands](#)

Defines an inactivity timeout in seconds. If a frame is not received from a client for the specified interval the current session is terminated.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

inactivity-timeout <60-86400>

**Parameters**

- inactivity-timeout <60-86400>

<table>
<thead>
<tr>
<th>&lt;60-86400&gt;</th>
<th>Defines the timeout interval after which a captive portal session is automatically terminated</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60-86400&gt;</td>
<td>- Specify a value from 60 - 86400 seconds. The default is 10 minutes or 600 seconds.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-captive-portal-test)#inactivity-timeout 750

rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
  access-type logging
  access-time 35
  custom-auth info bob bob@examplecompany.com
  connection-mode https
  inactivity-timeout 750
  accounting syslog host 172.16.10.13 port 1
rfs7000-37FABE(config-captive-portal-test)#

**Related Commands**

| no | Removes the client inactivity interval configured with this captive portal |
4.1.29.2.9  ipv6

> captive-portal-mode commands

Configures the internal captive portal server’s (running on the centralized mode) IPv6 address. If using centralized server mode, use this option to define the controller, service platform, or access point resource’s (hosting the captive portal) IPv6 address. For information on configuring the server mode, see server.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ipv6 server host <IPv6>

Parameters

- ipv6 server host <IPv6>

<table>
<thead>
<tr>
<th>ipv6 server host &lt;IPv6&gt;</th>
<th>Configures the IPv6 address of the internal captive portal server</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IPv6&gt;</td>
<td>&lt;IPv6&gt; – Specify the captive portal server’s global IPv6 address.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-6DCD4B(config-captive-portal-test2)#show context captive-portal test2
  access-type OAuth
  OAuth client-id Google TechPubs.printer.google.com
rfs7000-6DCD4B(config-captive-portal-test2)#

Related Commands

no

| no | Removes the captive portal server’s IPv6 address |
4.1.29.2.10 localization

captive-portal-mode commands

Configures an FQDN address string that enables the client to receive localization parameters. Use this option to add a URL to trigger a one-time redirect on demand. The defined URL is triggered from a mobile application to derive location information from the wireless network so an application can be localized to a particular store or region.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
localization [fqdn <WORD>|response <WORD>]
```

**Parameters**

- **localization [fqdn <WORD>|response <WORD>]**
  - Configures an FQDN address string that enables the client to receive localization parameters. This command also allows the configuration of a response message.

  - **fqdn <WORD>**
    - Configures the FQDN address string, which is used to obtain localization parameters for the captive portal's client.
    - `<WORD>` – Specify the FQDN address string. For example, local.guestaccess.com

  - **response <WORD>**
    - Configures a message, which is sent back to the client in response to the client's localization HTTP requests.
    - `<WORD>` – Specify the response message (should not exceed 512 characters in length). The following built-in query tags can be included in the response message:
      - `WING_TAG_CLIENT_IP` - Captive portal client IPv4 address
      - `WING_TAG_CLIENT_MAC` - Captive portal client MAC address
      - `WING_TAG_WLAN_SSID` - Captive portal client WLAN ssid
      - `WING_TAG_AP_MAC` - Captive portal client AP MAC address
      - `WING_TAG_AP_NAME` - Captive portal client AP Name
      - `WING_TAG_RF_DOMAIN` - Captive portal client RF Domain
      - `WING_TAG_USERNAME` - Captive portal authentication username
      - `WING_TAG_USERTYPE` - Captive portal usertype
    - Example:
      ```
      <local><site>WING_TAG_RF_DOMAIN</site><ap>WING_TAG_AP_NAME</ap></local>
      ```

**Examples**

```
nx4500-5CFA2B(config-captive-portal-test)#localization fqdn local.guestaccess.com

nx4500-5CFA2B(config-captive-portal-test)#localization response <local><site>SJZebra</site><ap>ap8132-74B45C</ap><user>Bob</user></local>

nx4500-5CFA2B(config-captive-portal-test)#show context include-factory | include localization

localization fqdn local.guestaccess.com
localization response <local><site>SJZebra</site><ap>ap8132-74B45C</ap><user>Bob</user></local>
```

```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the FQDN address string and response message configured on a captive portal for localization</td>
</tr>
</tbody>
</table>
4.1.29.2.11 logout-fqdn

Configures the *Fully Qualified Domain Name* (FQDN) address to logout of the session from the client.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**
```
logout-fqdn <WORD>
```

**Parameters**
- `logout-fqdn <WORD>`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>logout-fqdn &lt;WORD&gt;</code></td>
<td>Configures the FQDN address used to logout</td>
</tr>
<tr>
<td><code>&lt;WORD&gt;</code></td>
<td>Provide the FQDN address (for example, logout.guestaccess.com)</td>
</tr>
</tbody>
</table>

**Examples**
```
rfs7000-37FABE(config-captive-portal-test)#logout-fqdn logout.testuser.com
```
```
rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
  logout-fqdn logout.testuser.com
```
```
rfs7000-37FABE(config-captive-portal-test)#
```

**Related Commands**
- `no` | Clears the logout FQDN address |
4.1.29.2.12 no

captive-portal-mode commands

The no command reverts the selected captive portal’s settings or resets settings to default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [access-time|access-type|accounting|bypass|connection-mode|custom-auth|data-limit|inactivity-timeout|ipv6|localization|logout-fqdn|oauth|post-authentication-vlan|radius-vlan-assignment|redirection|report-loyalty-application|server|simultaneous-users|terms-agreement|use|webpage|webpage-auto-upload|webpage-location|welcome-back]

no [access-time|access-type|connection-mode|data-limit|inactivity-timeout|logout-fqdn|post-authentication-vlan|radius-vlan-assignment|report-loyalty-application|simultaneous-users|terms-agreement|webpage-auto-upload|webpage-location]

no accounting [radius|syslog]

no bypass captive-portal-detection

no custom-auth info

no ipv6 server host

no localization [fqdn|response]

no oauth {client-id}

no redirection ports

no server host

no server mode {centralized-controller [hosting-vlan-interface]}

no use [aaa-policy|dns-whitelist]

no webpage external [acknowledgment|agreement|fail|login {post}|no-service|registration|welcome]

no webpage internal [acknowledgment|agreement|fail|login|no-service|org-name|org-signature|registration|welcome]

no webpage internal [org-name|org-signature]

no webpage internal [acknowledgment|agreement|fail|login|no-service]

[body-background-color|body-font-color|description|footer|header|main-logo|org-background-color|org-font-color|small-logo|title]

no webpage internal registration [body-background-color|body-font-color|description|field|footer|header|main-logo|org-background-color|org-font-color|small-logo|title]

no webpage internal registration field [age-range|city|country|custom <FIELD-NAME>|disclaimer|dob|email|gender|member|mobile|name|optout|street|via-email|via-sms|zip]{enable}

no webpage internal welcome [body-background-color|body-font-color|description|footer|header|main-logo|org-background-color|org-font-color|small-logo|title]

no welcome-back pass-through
Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes or resets this captive portal's settings, based on the parameters passed. |

Examples

The following example shows the captive portal 'test' settings before the 'no' commands are executed:

rfs7000-37FABE(config-captive-portal-test)#show context
captive-portal test
  access-type logging
  access-time 35
  custom-auth info bob bob@examplecompany.com
  connection-mode https
  inactivity-timeout 750
  accounting syslog host 172.16.10.13 port 1
rfs7000-37FABE(config-captive-portal-test)#

rfs7000-37FABE(config-captive-portal-test)#no accounting syslog
rfs7000-37FABE(config-captive-portal-test)#no access-type

The following example shows the captive portal 'test' settings after the 'no' commands are executed:

rfs7000-37FABE(config-captive-portal-test)#show context
captive-portal test
  access-time 35
  custom-auth info bob bob@examplecompany.com
  connection-mode https
  inactivity-timeout 750
rfs7000-37FABE(config-captive-portal-test)#
4.1.29.2.13 oauth

.oauth {client-id [facebook|google] <WORD>}

Parameters
- oauth {client-id [facebook|google] <WORD>}

Example
rfs7000-6DCD4B(config-captive-portal-test2)#OAuth client-id Google TechPubs.printer.google.com
rfs7000-6DCD4B(config-captive-portal-test2)#show context captive-portal test2

Related Commands
- no

Removes all OAuth client identities configured for this captive portal
4.2.9.2.14 post-authentication-vlan

Captive-portal-mode commands

Configures the VLAN that is assigned to this captive portal’s users upon successful authentication.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
post-authentication-vlan [<1-4096>|<VLAN-ALIAS>]

Parameters
- post-authentication-vlan [<1-4096>|<VLAN-ALIAS>]

| post-authentication-vlan [<1-4096>|<VLAN-ALIAS>] | Configures the post authentication VLAN. The VLAN specified here is assigned to this captive portal’s users after they have authenticated and logged on to the network. Provide the VLAN ID, or use an existing VLAN alias to identify the post authentication VLAN.
| | • <1-4096> – Specify the VLAN’s number from 1 - 4096.
| | • <VLAN-ALIAS> – Specify the VLAN alias (should be existing and configured).
| | Note: VLAN alias names begin with a ‘$’.

Examples
rfs4000-229D58(config-captive-portal-test)#post-authentication-vlan 1
rfs4000-229D58(config-captive-portal-test)#show context captive-portal test

| post-authentication-vlan 1 |
| rfs4000-229D58(config-captive-portal-test)# |

Related Commands
- no
  Removes the post authentication RADIUS VLAN assigned to this captive portal’s users

- radius-vlan-assignment
  Enables assignment of a RADIUS VLAN for this captive portal
4.1.29.2.15  \texttt{radius-vlan-assignment}

- \textit{captive-portal-mode commands}

Enables assignment of a RADIUS VLAN for this captive portal.

When enabled, if the RADIUS server as part of the authentication process returns a client's VLAN-ID in a RADIUS access-accept packet, all client traffic is forwarded on the post authentication VLAN. If disabled, the RADIUS server's VLAN assignment is ignored and the VLAN configuration defined within the WLAN configuration is used instead. This feature is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

\textbf{Syntax}
\begin{verbatim}
radius-vlan-assignment
\end{verbatim}

\textbf{Parameters}
None

\textbf{Examples}
\begin{verbatim}
rfs4000-229D58(config-captive-portal-test)#radius-vlan-assignment
rfs4000-229D58(config-captive-portal-test)#show context captive-portal test
post-authentication-vlan 1
radius-vlan-assignment
rfs4000-229D58(config-captive-portal-test)#
\end{verbatim}

\textbf{Related Commands}
\begin{table}[h]
\centering
\begin{tabular}{|l|l|}
\hline
\textbf{Command} & \textbf{Description} \\
\hline
\texttt{no} & Disables assignment of a RADIUS VLAN for this captive portal \\
\hline
\texttt{post-authentication-vlan} & Assigns a post authentication RADIUS VLAN for this captive portal's users \\
\hline
\end{tabular}
\end{table}
4.1.29.2.16 redirection

**captive-portal-mode commands**

Configures a list of destination ports (separated by commas, or using a dash for a range) that are taken into consideration when redirecting client connections

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

redirection ports <LIST-OF-PORTS>

**Parameters**

- redirection ports <LIST-OF-PORTS>

<table>
<thead>
<tr>
<th>ports &lt;LIST-OF-PORTS&gt;</th>
<th>Configures destination ports considered for redirecting client connection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Note:</strong> A maximum of 16 ports can be specified in a comma-separated list. Standard ports 80 and 443 are always considered for client connections regardless of what's entered by the administrator.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs4000-229D58(config-captive-portal-test)#redirection ports 1,2,3
rfs4000-229D58(config-captive-portal-test)#show context captive-portal test redirection ports 1-3
rfs4000-229D58(config-captive-portal-test)#
```

**Related Commands**

- **no** Disables redirection of client connection
4.1.29.2.17  report-loyalty-application

> captive-portal-mode commands

Enables detection of captive portal client’s usage of a selected (preferred) loyalty application

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

report-loyalty-application {custom-app <APPLICATION-NAME>}

Parameters

- report-loyalty-application {custom-app <APPLICATION-NAME>}

report-loyalty-application {custom-app <APPLICATION-NAME>}

Reports a captive portal client’s loyalty application presence and stores this information in the captive portal’s user database. The client’s loyalty application detection occurs on the access point to which the client is associated. Retail administrators can use this information to assess whether patrons’ loyalty application usage is as per expectation within specific retail environments. This option is disabled by default.

- custom-app <APPLICATION-NAME> – Optional. Uses a custom application definition as match criteria.
- <APPLICATION-NAME> – Specify the custom application name (should be existing and configured). Ensure that the application specified is available and configured. If not, create an application definition. For more information, see application.

Note: If no custom application definition is specified, the system uses localization to detect application presence.

Examples

nx9500-6C8809(config-captive-portal-test)#report-loyalty-application custom-app AntiVirus

nx9500-6C8809(config-captive-portal-test)#show context include-factory | include report-loyalty-application

report-loyalty-application custom-app AntiVirus

nx9500-6C8809(config-captive-portal-test)#

Related Commands

no

Disables detection of customer-loyalty application presence
4.1.29.2.18 server

>captive-portal-mode commands

Configures captive portal server parameters, such as the hostname, IP address, and mode of operation. This is the server validating guest user permissions.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

server [host|mode]
server host <IP/HOSTNAME>
server mode [centralized|centralized-controller {hosting-vlan-interface <0-4096>}| self]

Parameters

- server host <IP/HOSTNAME>
  
  Configures the internal captive portal authentication server (wireless controller, access point, service platform)
  
  <IP/HOSTNAME> – Specify the IPv4/IPv6 address or hostname of the captive portal server.
  
  Note: For centralized-controller mode, the server host should be a virtual hostname and not an IP address.

- server mode [centralized|centralized-controller {hosting-vlan-interface <0-4096>}| self]

  Configures the captive portal server mode. This parameter identifies the devices that will capture and redirect a wireless user’s Web browser session to a landing page where the user has to provide login credentials in order to access the associated WLAN. The WiNG captive portal implementation is very flexible and allows the captive portal services to reside anywhere within the WiNG managed network. For example, the capture and redirection can be performed directly by the access points at the edge of the network, centrally on the controllers or service platforms managing the access points, or on dedicated wireless controller deployed within an isolated network.

  centralized
  
  Considers the configured server’s hostname or IP address as the centralized captive portal server. When selected, capture and redirection is provided by a designated controller/service platform on the network defined using an IPv4/IPv6 address or hostname. The controller/service platform can either be managing the dependent/independent access points or be a dedicated device deployed over the intermediate network.

  centralized-controller {hosting-vlan-interface <0-4096>}</n
  Considers the configured server’s virtual hostname as the centralized captive portal server. When selected, capture and redirection is provided by a cluster of controllers/service platforms that are managing the dependent/independent access points using a virtual hostname.
  
  hosting-vlan-interface – Optional. Configures the VLAN where the client can reach the wireless controller (server). This option is available only for the centralized-controller mode.
  
  <0-4096> – Specify the VLAN number (0 implies the controller is available on the client’s VLAN).
### Examples

```
rfs7000-37FABE(config-captive-portal-test)#server host 172.16.10.9
rfs7000-37FABE(config-captive-portal-test)#show context
captive-portal test
  access-time 35
  custom-auth info bob bob@examplecompany.com
  connection-mode https
  inactivity-timeout 750
  server host 172.16.10.9
rfs7000-37FABE(config-captive-portal-test)#
```

### Related Commands

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Resets or disables captive portal host and mode settings</td>
</tr>
</tbody>
</table>
4.1.29.2.19 simultaneous-users

- **captive-portal-mode commands**

Specifies the number of users (client MAC addresses) that can simultaneously logon to the captive portal. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`simultaneous-users <1-8192>`

**Parameters**

- `simultaneous-users <1-8192>`

<table>
<thead>
<tr>
<th>simultaneous-users &lt;1-8192&gt;</th>
<th>Specifies the number of MAC addresses that can simultaneously access the captive portal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;1-8192&gt; – Select a number from 1 - 8192.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FABE(config-captive-portal-test)#simultaneous-users 5
rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
access-time 35
custom-auth info bob bob@examplecompany.com
connection-mode https
inactivity-timeout 750
server host 172.16.10.9
simultaneous-users 5
rfs7000-37FABE(config-captive-portal-test)#
```

**Related Commands**

| no | Resets or disables captive portal commands |
4.1.29.2.20 terms-agreement

- **captive-portal-mode commands**

Enforces the user to agree to terms and conditions (included in the login page) for captive portal access. This feature is disabled by default.

When enabled, the system enforces a previously registered user to re-confirm the terms of agreement, on successive log ins, only if the interval between the last log out and the current log in exceeds the `agreement-refresh` timeout configured in the WLAN context. For more information on configuring the agreement-refresh timeout value, see registration.

For example:

If the agreement-refresh timeout is set at 20 minutes, the following two possibilities can arise:

- The interval between logging out and re-logging **exceeds** 20 minutes - in which case the user is served the Terms of Agreement page on successful authentication.
- The interval between logging out and re-logging is **less than** 20 minutes - in which case the user is provided direct Internet access.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9510, NX9600

**Syntax**

```
terms-agreement
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-captive-portal-test)#terms-agreement

rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
  access-time 35
  custom-auth info bob bob@examplecompany.com
  connection-mode https
  inactivity-timeout 750
  server host 172.16.10.9
  simultaneous-users 5
  terms-agreement

rfs7000-37FABE(config-captive-portal-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Resets or disables captive portal commands</td>
</tr>
</tbody>
</table>
4.1.29.2.21 use

`captive-portal-mode commands`

Configures a AAA policy and DNS whitelist with this captive portal policy. AAA policies are used to configure authentication and accounting servers for this captive portal. DNS whitelists restrict users to a set of configurable domains on the Internet.

For more information on AAA policies, see `AAA-POLICY`.

For more information on DNS whitelists, see `dns-whitelist`.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`use [aaa-policy <AAA-POLICY-NAME>|dns-whitelist <DNS-WHITELIST-NAME>]`

**Parameters**

- `use [aaa-policy <AAA-POLICY-NAME>|dns-whitelist <DNS-WHITELIST-NAME>]`

| aaa-policy `<AAA-POLICY-NAME>` | Configures a AAA policy with this captive portal. AAA policies validate user credentials and provide captive portal access to the network.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;AAA-POLICY-NAME&gt;</code> – Specify the AAA policy name.</td>
</tr>
</tbody>
</table>

| dns-whitelist `<DNS-WHITELIST-NAME>` | Configures a DNS whitelist to use with this captive portal. DNS whitelists restrict captive portal access.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;DNS-WHITELIST-NAME&gt;</code> – Specify the DNS whitelist name.</td>
</tr>
</tbody>
</table>

**Note:** To effectively host captive portal pages on an external Web server, the IP address of the destination Web server(s) should be added to the DNS whitelist.

**Examples**

```
rfs7000-37FABE(config-captive-portal-test)#use aaa-policy test
rfs7000-37FABE(config-captive-portal-test)#use dns-whitelist test
rfs7000-37FABE(config-captive-portal-test)#show context
captive-portal test
  access-time 35
  custom-auth info bob bobs@examplecompany.com
  connection-mode https
  inactivity-timeout 750
  server host 172.16.10.9
  simultaneous-users 5
  terms-agreement
  use aaa-policy test
  use dns-whitelist test
rfs7000-37FABE(config-captive-portal-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a DNS Whitelist or a AAA policy from the captive portal</td>
</tr>
<tr>
<td>dns-whitelist</td>
<td>Configures a DNS whitelist</td>
</tr>
<tr>
<td>aaa-policy</td>
<td>Configures a AAA policy</td>
</tr>
</tbody>
</table>
4.1.29.2.22 webpage

- *captive-portal-mode commands*

Use this command to define the appearance and flow of Web pages requesting clients encounter when accessing a controller, service platform, or access point managed captive portal. Define whether the Web pages are maintained locally or externally to the managing device as well as messages displayed requesting clients.

Configures Web pages displayed when interacting with a captive portal. These pages are:

- acknowledgment – This page displays details for the user to acknowledge
- agreement – This page displays “Terms and Conditions” that a user accepts before allowed access to the captive portal.
- fail – This page is displayed when the user is not authenticated.
- login – This page is displayed when the user connects to the captive portal. It fetches login credentials from the user.
- no-service – This page is displayed when a captive portal user is unable to access the captive portal due to unavailability of critical services.
- registration – This page is displayed when users are redirected to a Web page where they have to register in the captive portal’s database.
- welcome – This page is displayed to welcome an authenticated user to the captive portal.

These Web pages, which interact with captive portal users, can be located either on the controller or an external location.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```text
webpage [external|internal]
webpage external [acknowledgment|agreement|fail|login {post}|no-service|registration|welcome] <URL>
webpage internal [acknowledgment|agreement|fail|login|no-service|org-name|org-signature|registration|welcome]
  [description|footer|header|title] <CONTENT>
webpage internal [acknowledgment|agreement|fail|login|no-service|registration|welcome]
  [body-background-color|body-font-color|org-background-color|org-font-color] <WORD>
webpage internal [acknowledgment|agreement|fail|login|no-service|registration|welcome]
  [main-logo use-as-banner|small-logo] <URL>
webpage internal registration field [age-range|city|country|custom|disclaimer|dob|email|gender|member|mobile|name|optout|street|via-email|via-sms|zip] type [checkbox|date|dropdown-menu|e-address|number|radio-button|text] enable {label <LINE>|mandatory|title <LINE>|placeholder <LINE>}
webpage internal welcome use-external-success-url
webpage internal [org-name|org-signature] <LINE>
```
### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>webpage external</td>
<td>Indicates Web pages being served are hosted on an external (to the captive portal) server resource.</td>
</tr>
<tr>
<td>acknowledgment</td>
<td>Indicates the page is displayed for user acknowledgment of details. Users are redirected to this page to acknowledge information provided.</td>
</tr>
<tr>
<td>agreement</td>
<td>Indicates the page is displayed for “Terms &amp; Conditions”. The agreement page provides conditions that must be agreed to before captive portal access is permitted.</td>
</tr>
<tr>
<td>fail</td>
<td>Indicates the page is displayed for login failure. The fail page asserts authentication attempt has failed, the user is not allowed to access the Internet (using this captive portal) and must provide the correct login information again to access the Internet.</td>
</tr>
</tbody>
</table>
| login {post}    | Indicates the page is displayed for getting user credentials. This page is displayed by default.  
  - post – Optional. Redirects users to post externally during authentication.  
  The login page prompts the user for a username and password to access the captive portal and proceed to either the agreement page (if used) or the welcome page. |
| no-service      | Indicates the page is displayed when certain critical services are unavailable and the user fails to access the captive portal. The no-service page asserts the captive portal service is temporarily unavailable due to technical reasons. Once the services become available, the captive portal user is automatically connected back to the services available through the captive portal. The possible scenarios are:  
  - The RADIUS server (on-board or external) is not reachable and the user cannot be authenticated  
  - The external captive portal server is not reachable  
  - The connectivity between the adopted AP and controller is lost  
  - The external DHCP server is not reachable  
  To provide this service, enable the following:  
  - External captive portal server monitoring  
  - AAA server monitoring. This enables detection of RADIUS server failure.  
  - External DHCP server monitoring  
  **Note:** For more information on enabling these critical resource monitoring, see service. |
| registration    | Indicates the page is displayed when users are redirected to a Web page where they have to register in the captive portal’s database. Guest users are redirected to an internally (or) externally hosted registration page (registration.html) upon association to a captive portal SSID, where previously, not-registered guest users can register. |
| welcome         | Indicates the page is displayed after a user has been successfully authenticated. The welcome page asserts a user has logged in successfully and can access the captive portal. |
This parameter is common to all of the above mentioned Web pages, and specifies the Web page URL. The Web page is retrieved and served from the specified external location.

The URL can include following query tags:
- 'WING_TAG_CLIENT_IP' - Captive portal client IPv4 address
- 'WING_TAG_CLIENT_MAC' - Captive portal client MAC address
- 'WING_TAG_WLAN_SSID' - Captive portal client WLAN ssid
- 'WING_TAG_AP_MAC' - Captive portal client AP MAC address
- 'WING_TAG_AP_NAME' - Captive portal client AP Name
- 'WING_TAG_RF_DOMAIN' - Captive portal client RF Domain
- 'WING_TAG_CP_SERVER' - Captive portal server address
- 'WING_TAG_USERNAME' - Captive portal authentication username

Example:

Use '&' or '?' character to separate field-value pair.

**Note:** Enter ‘ctrl-v’ followed by ‘?’ to configure query string.

### webpage internal [acknowledgment|agreement|fail|login|no-service|registration|welcome] [description|footer|header|title] <CONTENT>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>internal</td>
<td>Indicates the Web pages are hosted on an internal server resource. This is the default setting.</td>
</tr>
<tr>
<td>acknowledgment</td>
<td>Indicates the Web page is displayed for users to acknowledge the information provided</td>
</tr>
<tr>
<td>agreement</td>
<td>Indicates the page is displayed for “Terms &amp; Conditions”</td>
</tr>
<tr>
<td>fail</td>
<td>Indicates the page is displayed for login failure</td>
</tr>
<tr>
<td>login</td>
<td>Indicates the page is displayed for entering user credentials</td>
</tr>
<tr>
<td>no-service</td>
<td>Indicates the page is displayed when certain critical services are unavailable and the user fails to access the captive portal. The possible scenarios are:</td>
</tr>
<tr>
<td>registration</td>
<td>Indicates the page is displayed when users are redirected to a Web page where they have to register in the captive portal's database</td>
</tr>
<tr>
<td>welcome</td>
<td>Indicates the page is displayed after a user has been successfully authenticated</td>
</tr>
</tbody>
</table>

**Note:** For more information on enabling these critical resource monitoring, see service.
<table>
<thead>
<tr>
<th>keyword</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Indicates the content is the description portion of each of the following internal Web pages: acknowledgment, agreement, fail, login, no-service, and welcome</td>
</tr>
<tr>
<td>footer</td>
<td>Indicates the content is the footer portion of each of the following internal Web pages: acknowledgment, agreement, fail, no-service, and welcome page. The footer portion contains the signature of the organization that hosts the captive portal.</td>
</tr>
<tr>
<td>header</td>
<td>Indicates the content is the header portion of each of the following internal Web pages: acknowledgment, agreement, fail, no-service, and welcome page. The header portion contains the heading information for each of these pages.</td>
</tr>
<tr>
<td>title</td>
<td>Indicates the content is the title of each of the following internal Web pages: acknowledgment, agreement, fail, no-service, and welcome page. The title for each of these pages is configured here.</td>
</tr>
<tr>
<td>&lt;CONTENT&gt;</td>
<td>The following keyword is common to all of the above internal Web page options: &lt;CONTENT&gt; – Specify the content displayed for each of the different components of the internal Web page. Enter up to 900 characters for the description and 256 characters each for header, footer, and title.</td>
</tr>
<tr>
<td>internal</td>
<td>Indicates the Web pages are hosted on an internal server resource</td>
</tr>
<tr>
<td>agreement</td>
<td>Indicates the page is displayed for “Terms &amp; Conditions”</td>
</tr>
<tr>
<td>acknowledgment</td>
<td>Indicates the Web page is displayed for users to acknowledge the information provided</td>
</tr>
<tr>
<td>fail</td>
<td>Indicates the page is displayed for login failure</td>
</tr>
<tr>
<td>login</td>
<td>Indicates the page is displayed for user credentials</td>
</tr>
<tr>
<td>no-service</td>
<td>Indicates the page is displayed when certain critical services are unavailable and the user fails to access the captive portal. The possible scenarios are:</td>
</tr>
<tr>
<td></td>
<td>- The RADIUS server (on-board or external) is not reachable and the user cannot be authenticated</td>
</tr>
<tr>
<td></td>
<td>- The external captive portal server is not reachable</td>
</tr>
<tr>
<td></td>
<td>- The connectivity between the adopted AP and controller is lost</td>
</tr>
<tr>
<td></td>
<td>- The external DHCP server is not reachable</td>
</tr>
<tr>
<td></td>
<td>To provide this service, enable the following:</td>
</tr>
<tr>
<td></td>
<td>- External captive portal server monitoring</td>
</tr>
<tr>
<td></td>
<td>- AAA server monitoring. This enables detection of RADIUS server failure.</td>
</tr>
<tr>
<td></td>
<td>- External DHCP server monitoring</td>
</tr>
<tr>
<td></td>
<td>- AP to controller connectivity monitoring</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> For more information on enabling these critical resource monitoring, see wlan.</td>
</tr>
<tr>
<td>registration</td>
<td>Indicates the page displayed is the registration page to which users are redirected in order to register in the captive portal’s database</td>
</tr>
<tr>
<td></td>
<td>Guest users are redirected to an internally (or) externally hosted registration page (registration.html) upon association to a captive portal SSID, where previously, not-registered guest users can register.</td>
</tr>
<tr>
<td>welcome</td>
<td>Indicates the page is displayed after a user has been successfully authenticated</td>
</tr>
</tbody>
</table>
GLOBAL CONFIGURATION COMMANDS

| main-logo | The following keyword is common to all of the above internal Web page options:  
| use-as-banner | • main-logo – Indicates the main logo displayed in the header of each Web page  
| | • use-as-banner – Uses the image, specified here, as the Web page banner, in place of the logo and organization name  
| small-logo | The following keyword is common to all of the above internal Web page options:  
| | • small-logo – Indicates the logo image displayed in the footer of each Web page, and constitutes the organization's signature  
| <URL> | This parameter is common to the 'main-logo' and 'small-logo' keywords and provides the complete URL from where the main-logo and small-logo files are loaded and subsequently cached on the system.  
| | • <URL> – Specify the location and name of the main-logo and the small-logo image files.  

- webpage internal registration field [age-range|city|country|custom|disclaimer|dob|email|gender|member|mobile|name|optout|street|via-email|via-sms|zip] type [checkbox|date|dropdown-menu|e-address|number|radio-button|text] enable {label <LINE>|mandatory|title <LINE>|placeholder <LINE>}

| internal | Indicates the Web pages are hosted on an internal server resource  
| registration | Allows you to customize the user registration page. Select this option if the captive-portal's access-type is set to registration. Use the field and type options to define the input fields (for example, age-range, city, email, etc.) and the field type (for example, text, checkbox, dropdown-menu, radio-button, etc.)  
| | Note: Guest users are redirected to an internally (or) externally hosted registration page (registration.html) upon association to a captive portal SSID, where previously, not-registered guest users can register.  
| | If the registration Web page is not customized, the built-in, default registration page is displayed to the client.  
| field [age-range|city|country|custom <WORD>|disclaimer[]] | Configures the captive portal's registration page fields  
| | Following are the available fields and the field type for each:  
| | • age-range – Creates the age-range input field (enabled by default and included in the built-in registration page)  
| | • dropdown-menu – Configures the age-range field as a drop-down menu  
| | • radio-button – Configures the age-range field as a radio button menu  
| | • city – Creates the postal address: city name input field (enabled by default and included in the built-in registration page)  
| | • text – Configures the city field as only alpha-numeric and special characters input field  
| | • country – Creates the postal address: country name input field (disabled by default)  
| | • text – Configures the country field as only alpha-numeric and special characters input field  
| | • custom <WORD> – Creates a customized field (as per your requirement). Use the ‘custom’ option to create a field not included in the built-in list.  
| | • <WORD> – Provide a name for the field. On the registration page, the field is displayed under the name specified here.  
| | • checkbox – Configures client’s disclaimer-confirmation input field (disabled by default)  
| | • checkbox – Configures the disclaimer field as a check box  

Contd..
field [dob|email|gender|member|mobile|name|optout|street|via-email|via-sms|zip]

- dob – Creates the client’s *date of birth* (DoB) input field (disabled by default)
  - date – Configures the DoB field as only date-format input field
  - dropdown-menu – Configures the DoB field as a drop-down menu
  - text – Configures the DoB field as only alpha-numeric and special characters input field
- email – Creates the e-mail address input field (enabled by default and included in the built-in registration page)
  - e-address – Configures the e-mail field as only e-mail address format input field
- gender – Creates client’s gender input field (disabled by default)
  - dropdown-menu – Configures the gender field as a drop-down menu
  - radio-button – Configures the gender field as a radio button menu
- member – Creates client’s loyalty or captive-portal membership card number input field (disabled by default)
  - number – Configures the member field as only-numeric characters input field
  - text – Configures the member field as only alpha-numeric and special characters input field
- mobile – Creates the mobile number input field (enabled by default and included in the built-in registration page)
  - number – Configures the mobile field as only-numeric characters input field
  - text – Configures the mobile field as only alpha-numeric and special characters input field
- name – Creates the client name input field (enabled by default and included in the built-in registration page)
  - text – Configures the name field as only alpha-numeric and special characters input field
- optout – Creates an input field that enables clients to opt out from registering
  - checkbox – Configures the optout field as a check box
- street – Creates the *postal address: street name/number* input field (enabled by default and included in the built-in registration page)
  - text – Configures the street field as only alpha-numeric and special characters input field
- via-email – Creates the client’s preferred mode of communication as e-mail input field (enabled by default and included in the built-in registration page)
  - checkbox – Configures the via-email field as a check box
- via-sms – Creates the client’s preferred mode of communication as SMS input field (enabled by default and included in the built-in registration page)
  - checkbox – Configures the via-sms field as a check box
- zip – Creates the *postal address: zip* input field (enabled by default and included in the built-in registration page)
  - number – Configures the zip field as only-numeric characters input field
  - text – Configures the zip field as only alpha-numeric and special characters input field
After specifying the field, configure the field type. The options displayed depend on the field selected in the previous step. These options are: checkbox, date, dropdown-menu, e-address, number, radio-button, and text.

- **checkbox** – Configures the field as a check box
- **date** – Configures the field as only date-format input field
- **dropdown-menu** – Configures the field as a drop-down menu
- **e-address** – Configures the field as an e-mail address input field
- **number** – Configures the field as only-numeric characters input field
- **radio-button** – Configures the field as a radio button
- **text** – Configures the field as only alpha-numeric and special characters input field

**Note:** Some of the fields can have more than one field type options. For example, the field ‘zip’ can either be a numerical field or a text. Select the one best suited for your captive-portal.

Enables the field. When enabled, the field is displayed on the registration page. After enabling the field, optionally configure the following parameters:

- **label** <LINE> – Optional. Configures the field’s label
- **mandatory** – Optional. Makes the field mandatory
- **title** – Optional. Configures the comma-separated list of items to include in the drop-down menu.
- **placeholder** <LINE> – Optional. Configures a string, not exceeding 300 characters, that is displayed within the field. If not configured, the field remains blank.

---

<table>
<thead>
<tr>
<th><strong>webpage internal welcome use-external-success-url</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>internal</strong></td>
</tr>
<tr>
<td><strong>welcome</strong></td>
</tr>
<tr>
<td><strong>use-external-success-url</strong></td>
</tr>
</tbody>
</table>

| **webpage internal [org-name|org-signature] <LINE>** |
| --- |
| **internal** | Indicates the Web pages are hosted on an internal server resource |
| **org-name** | Specifies the company’s name, included on Web pages along with the main image |
| **org-signature** | Specifies the company’s signature information, included in the bottom of Web pages along with a small image |
| **<LINE>** | Specify the company’s name or signature depending on the option selected. |
Examples


rfs6000-81701D(config-captive-portal-guest)#show context captive-portal guest
webpage external welcome http://192.168.9.46/welcome.html
rfs6000-81701D(config-captive-portal-guest)#

nx9500-6C8809(config-captive-portal-register)#webpage internal registration field age-range type dropdown-menu enable mandatory label "Age Range" title "10-20,20-30,30-40,50-60,60-70"

nx9500-6C8809(config-captive-portal-register)#show context include-factory | include age-range
webpage internal registration field age-range type dropdown-menu enable mandatory label "Age Range" title "10-20,20-30,30-40,50-60,60-70"

In the following examples, the background and font colors have been customized for the captive portal's login page. Similar customizations can be applied to the acknowledgement, agreement, fail, welcome, no-service, and registration captive portal pages.

rfs6000-81701D(config-captive-portal-cap-enhanced-policy)#webpage internal login body-background-color #E7F0EB
rfs6000-81701D(config-captive-portal-cap-enhanced-policy)#webpage internal login body-font-color #EF68A7
rfs6000-81701D(config-captive-portal-cap-enhanced-policy)#webpage internal login org-background-color #EFE4E9
rfs6000-81701D(config-captive-portal-cap-enhanced-policy)#webpage internal login org-font-color #BA4A21
rfs6000-81701D(config-captive-portal-cap-enhanced-policy)#show context captive-portal cap-enhanced-policy
webpage internal login org-background-color #EFE4E9
webpage internal login org-font-color #BA4A21
webpage internal login body-background-color #E7F0EB
webpage internal login body-font-color #EF68A7
rfs6000-81701D(config-captive-portal-ca-enhanced-policy)#

The following examples configure a scenario where a successfully authenticated user is redirected to an externally hosted Welcome page from the internal landing page.

rfs6000-81701D(config-captive-portal-cap-enhanced-policy)#webpage external welcome
rfs6000-81701D(config-captive-portal-cap-enhanced-policy)#webpage internal welcome use-external-success-url
rfs6000-81701D(config-captive-portal-cap-enhanced-policy)#show context captive-portal cap-enhanced-policy
webpage internal acknowledgement org-background-color #33ff88
webpage internal acknowledgement org-font-color #bb6622
webpage internal acknowledgement body-background-color #22aa11
webpage internal acknowledgement body-font-color #bb6622
webpage internal welcome use-external-success-url
rfs6000-81701D(config-captive-portal-ca-enhanced-policy)#

Related Commands

<table>
<thead>
<tr>
<th></th>
<th>Resets or disables captive portal configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td></td>
</tr>
</tbody>
</table>
4.1.29.23 webpage-auto-upload

* captive-portal-mode commands

Enables automatic upload of advanced Web pages to requesting clients on association. Enable this option if the webpage-location is selected as advanced. For more information, see `webpage-location`.

If this feature is enabled, access points shall request for Web pages from the controller during adoption. If the controller has a different set of Web pages, than the ones existing on the access points, the controller shall distribute the Web pages uploaded on it to the access points.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`webpage-auto-upload`

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-captive-portal-test)#webpage-auto-upload
rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test webpage-auto-upload logout-fqdn logout.testuser.com
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables automatic upload of advanced Web pages on a captive portal</td>
</tr>
<tr>
<td>webpage</td>
<td>Configures Web pages displayed when interacting with a captive portal</td>
</tr>
<tr>
<td>webpage-location</td>
<td>Specifies the location of the Web pages used for authentication</td>
</tr>
</tbody>
</table>
4.1.29.2.24 webpage-location

```markdown
**captive-portal-mode commands**

Specifies the location of the Web pages used for authentication. These pages can either be hosted on the system or on an external Web server.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600
```

**Syntax**

```bash
webpage-location [advanced|external|internal]
```

**Parameters**

- `webpage-location [advanced|external|internal]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>advanced</td>
<td>Uses Web pages for login, welcome, failure, and terms created and stored on the controller. Select <strong>advanced</strong> to use a custom-developed directory full of Web page content that can be copied in and out of the controller, service platform, or access point. If selecting advanced, enable the <code>webpage-auto-upload</code> option to automatically launch the advanced pages to requesting clients upon association. For more information, see <code>webpage-auto-upload</code>.</td>
</tr>
<tr>
<td>external</td>
<td>Uses Web pages for login, welcome, failure, and terms located on an external server. Provide the URL for each of these pages.</td>
</tr>
<tr>
<td>internal</td>
<td>Uses Web pages for login, welcome, and failure that are automatically generated</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FABE(config-captive-portal-test)#webpage-location external

rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
  access-time 35
  connection-mode https
  inactivity-timeout 750
  server host 172.16.10.9
  simultaneous-users 5
  terms-agreement webpage-location external
  use aaa-policy test

rfs7000-37FABE(config-captive-portal-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets or disables captive portal Web page settings</td>
</tr>
<tr>
<td><code>webpage</code></td>
<td>Configures a captive portal’s Web page (acknowledgment, agreement, login, welcome, fail, no-service, and terms) settings</td>
</tr>
<tr>
<td><code>webpage-auto-upload</code></td>
<td>Enables an automatic upload of advanced Web pages on a captive portal</td>
</tr>
</tbody>
</table>
### 4.1.29.2.25 welcome-back

#### captive-portal-mode commands

Enables the provision of direct Internet access to once-registered, captive-portal guest users on subsequent log-ins. When enabled, a previously registered captive-portal guest user, on subsequent logins, is served the Acknowledgement page only if:

- The `agreement-refresh` option is enabled for device-based (device and device-OTP) registration, and
- The interval between logout and login is **lesser** than the `agreement-refresh` timeout configured in the WLAN context. If this interval exceeds the agreement-refresh timeout, the user is served the Agreement page. For more information on configuring the agreement-refresh timeout value, see registration.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
welcome-back pass-through
```

#### Parameters

- `welcome-back pass-through`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>welcome-back pass-through</td>
<td>Enables display of the Acknowledgement page to an already registered user on subsequent captive-portal log-ins, provided the interval between logout and login is lesser than the <code>agreement-refresh</code> timeout</td>
</tr>
<tr>
<td>pass-through</td>
<td>Provides user direct Internet access, from the Welcome-back page, without any user action</td>
</tr>
</tbody>
</table>

#### Examples

```bash
nx9500-6C8809(config-captive-portal-test)#show context captive-portal test
welcome-back pass-through
webpage internal registration field city type text enable label "City" placeholder "Enter City"
webpage internal registration field street type text enable label "Address" placeholder "123 Any Street"
webpage internal registration field name type text enable label "Full Name" placeholder "Enter First Name, Last Name"
webpage internal registration field zip type number enable label "Zip" placeholder "Zip"
webpage internal registration field via-sms type checkbox enable title "SMS Preferred"
webpage internal registration field mobile type number enable label "Mobile" placeholder "Mobile Number with Country code"
webpage internal registration field age-range type dropdown-menu enable label "Age Range" title "Age Range"
webpage internal registration field email type e-address enable mandatory label "Email" placeholder "you@domain.com"
webpage internal registration field via-email type checkbox enable title "Email Preferred"
```

#### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the provision of direct Internet access to once-registered, captive-portal guest users on subsequent log-ins</td>
</tr>
</tbody>
</table>
This section provides the configurations required to enable device registration with dynamic VLAN assignment in a multi-vendor environment.

1. Create vendor-specific RADIUS user groups, and assign an allowed VLAN to each group, as shown in the following examples:
   ```
nx9500-6C8809(config)#radius-group Apple
   nx9500-6C8809(config-radius-group-Apple)#policy vlan 200
   nx9500-6C8809(config)#radius-group Samsung
   nx9500-6C8809(config-radius-group-Samsung)#policy vlan 100
   nx9500-6C8809(config)#radius-group Devices
   nx9500-6C8809(config-radius-group-Devices)#policy vlan 1
   ```
   Note, if necessary, configure the session-time for each of the above configured RADIUS group. This is the duration for which a RADIUS group client’s session remains active after successful authentication. Upon expiration, the RADIUS session is terminated. Use the `policy > session-time > <5-144000>` command to specify the session-time.

2. Create a RADIUS user pool, add users to the pool, and assign the users to the vendor-specific user groups: as shown in the following examples:
   ```
nx9500-6C8809(config)#radius-user-pool-policy Vendor-Devices
   nx9500-6C8809(config-radius-user-pool-Vendor-Devices)#user Samsung password 0 samsung group Samsung
   nx9500-6C8809(config-radius-user-pool-Vendor-Devices)#user test password 0 test123 group Apple
   ```

3. Create a RADIUS server policy, and associate the RADIUS groups and user pool created in steps 1 and 2 respectively, as shown in the following examples:
   ```
nx9500-6C8809(config)#radius-server-policy Guest-Radius
   nx9500-6C8809(config-radius-server-policy-Guest-Radius)#use radius-user-pool-policy Vendor-Devices
   nx9500-6C8809(config-radius-server-policy-Guest-Radius)#use radius-group Samsung
   nx9500-6C8809(config-radius-server-policy-Guest-Radius)#use radius-group Sony
   nx9500-6C8809(config-radius-server-policy-Guest-Radius)#use radius-group Apple
   ```

4. Create AAA Policy pointing to to the controller (Controller)
   ```
nx9500-6C8809(config)#aaa-policy OnBoard-NX
   nx9500-6C8809(config-aaa-policy-OnBoard-NX)#authentication server 1 controller
   nx9500-6C8809(config-aaa-policy-OnBoard-NX)#show context
   aaa-policy OnBoard-NX
   authentication server 1 onboard self
   nx9500-6C8809(config-aaa-policy-OnBoard-NX)#
   ```

5. Create a captive-portal, and point to the captive-portal’s server, enable RADIUS VLAN assignment, and associate the AAA policy, as shown in the following examples:
   ```
nx9500-6C8809(config)#captive-portal DeviceRegistration
   nx9500-6C8809(config-captive-portal-DeviceRegistration)#server host captive.zebranoc.com
   nx9500-6C8809(config-captive-portal-DeviceRegistration)#radius-vlan-assignment
   nx9500-6C8809(config-captive-portal-DeviceRegistration)#use aaa-policy OnBoard-NX
   nx9500-6C8809(config-captive-portal-DeviceRegistration)#access-type radius
   ```

6. Configure a WLAN and enable RADIUS VLAN assignment, as shown in the following examples:
nx9500-6C8809(config)#wlan CP-OnBoarding
nx9500-6C8809(config-wlan-CP-OnBoarding)#ssid CP-OnBoarding
nx9500-6C8809(config-wlan-CP-OnBoarding)#radius vlan-assignment
nx9500-6C8809(config-wlan-CP-OnBoarding)#use aaa-policy OnBoard-NX
nx9500-6C8809(config-wlan-CP-OnBoarding)#use captive-portal DeviceRegistration
nx9500-6C8809(config-wlan-CP-OnBoarding)#captive-portal-enforcement fall-back
nx9500-6C8809(config-wlan-CP-OnBoarding)#registration device group-name Devices expiry-time 4320
nx9500-6C8809(config-wlan-CP-OnBoarding)#authentication-type mac

7. Create an access point profile, associate the RADIUS server policy, captive-portal policy to it, and also assign
the WLAN to the AP radio, as shown in the following examples:

nx9500-6C8809(config-profile-SITE-10)#use radius-server-policy Guest-Radius
nx9500-6C8809(config-profile-SITE-10)#use captive-portal server DeviceRegistration
nx9500-6C8809(config-profile-SITE-10-if-radio2)#wlan CP-OnBoarding bss 1 primary
nx9500-6C8809(config-profile-SITE-10-if-ge1)#switchport mode trunk
nx9500-6C8809(config-profile-SITE-10-if-ge1)#switchport trunk native vlan 90
nx9500-6C8809(config-profile-SITE-10-if-ge1)#switchport trunk allowed vlan 1,90,1000-1002
nx9500-6C8809(config-profile-SITE-10-if-ge1)#no switchport trunk native tagged

8. Use the access point profile in the access point's device context.

<table>
<thead>
<tr>
<th>Related Commands</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>radius-server-policy</td>
<td>Documents RADIUS server policy configuration commands</td>
</tr>
<tr>
<td>radius-group</td>
<td>Documents RADIUS group policy configuration commands</td>
</tr>
<tr>
<td>radius-user-pool-policy</td>
<td>Documents RADIUS user policy configuration commands</td>
</tr>
<tr>
<td>aaa-policy</td>
<td>Documents AAA policy configuration commands</td>
</tr>
<tr>
<td>captive portal</td>
<td>Documents captive-portal configuration commands</td>
</tr>
<tr>
<td>wlan</td>
<td>Documents WLAN configuration commands</td>
</tr>
<tr>
<td>Profile Config Commands</td>
<td>Documents profile configuration commands</td>
</tr>
<tr>
<td>guest-registration</td>
<td>Documents show &gt; guest-registration command and outputs. Use this command to view guest</td>
</tr>
<tr>
<td></td>
<td>registration statistics once device-regitration is enabled.</td>
</tr>
</tbody>
</table>
configuring WeChat Wi-Fi hotspot support in WiNG captive portal

WeChat is a popular messaging app used in China with more than 500 million installations. WeChat’s WiFi hotspot solution allows businesses to provide internet access to their customers. The WiNG captive portal can be configured to incorporate the WeChat WiFi hotspot, so that WeChat users, on their first connect to a WiNG access point, can automatically authenticate with the WeChat server through an intermediate server.

This section provides the configurations required to be made on the WiNG portal to enable WeChat Wi-Fi hotspot.

Configure the following parameters:

1. Create an AAA policy re-directing the WiNG captive portal user to WeChat’s AAA server for authentication, as shown in the following example:

```
x9500-6C8809(config)#aaa-policy cloud2
nx9500-6C8809(config-aaa-policy-cloud2)#authentication server 1 host cloud2.synchroweb.com secret 0 firmware
nx9500-6C8809(config-aaa-policy-cloud2)#show context
```

Note, Synchroweb is an independent software vendor (ISV), whose third-party software is being as the intermediate server. The AAA server and RADIUS accounting server configured in AAA policy must be as per the specification provided by the ISV.

2. Create a DNS whitelist, whitelisting WeChat’s server name in order to initiate RADIUS authentication. The “qq.com” domain name is where WeChat server can be reached.

```
x9500-6C8809(config)#dns-whitelist wxWL
nx9500-6C8809(config-dns-whitelist-wxWL)#permit cloud2.synchroweb.com
nx9500-6C8809(config-dns-whitelist-wxWL)#permit qq.com suffix
nx9500-6C8809(config-dns-whitelist-wxWL)#show context
dns-whitelist wxWL
  permit qq.com suffix
  permit cloud2.synchroweb.com
```

3. Create a captive portal and associate the AAA policy and DNS whitelist created in steps 1 & 2, as shown in the following example:

```
x9500-6C8809(config)#captive-portal wxCP
nx9500-6C8809(config-captive-portal-wxCP)#use aaa-policy cloud2
nx9500-6C8809(config-captive-portal-wxCP)#use dns-whitelist wxWL
```

4. Configure the following captive portal parameters:

```
x9500-6C8809(config)#captive-portal wxCP
nx9500-6C8809(config-captive-portal-wxCP)#access-time 10
nx9500-6C8809(config-captive-portal-wxCP)#server host guest.zebra.com
nx9500-6C8809(config-captive-portal-wxCP)#webpage-location external
nx9500-6C8809(config-captive-portal-wxCP)#webpage external login http://cloud2.synchroweb.com/wechat.nx/index.phpc=WING_TAG_CLIENT_MAC
nx9500-6C8809(config-captive-portal-wxCP)#show context
captive-portal wxCP
  access-time 10
  server host guest.zebra.com
  webpage-location external
  webpage external login http://cloud2.synchroweb.com/wechat.nx/index.phpc=WING_TAG_CLIENT_MAC
```

```
x9500-6C8809(config-captive-portal-wxCP)#show context
captive-portal wxCP
  access-time 10
  server host guest.zebra.com
  webpage-location external
  webpage external login http://cloud2.synchroweb.com/wechat.nx/index.phpc=WING_TAG_CLIENT_MAC
```

```
x9500-6C8809(config-captive-portal-wxCP)#use aaa-policy cloud2
```

```
x9500-6C8809(config-captive-portal-wxCP)#use dns-whitelist wxWL
```

Note, the login URL configured here must be as per the specifications provided by the ISV.

Note, the access-type remains unchanged (i.e radius, which is the default setting). The access-time is set to a minimum value (10 minutes in this example) in order to avoid the default value of 24 hours being applied, in case the RADIUS response does not contain the session-timeout attribute.

5. Create a WLAN and associate the captive portal created in step 3:

```
ng9500-6C8809(config-wlan-wxOpen)#use captive-portal wxCP
ng9500-6C8809(config-wlan-wxOpen)#captive-portal-enforcement
ng9500-6C8809(config-wlan-wxOpen)#show context
wlan wxOpen
ssid wxOpen
vlan 200
bridging-mode local
encryption-type none
authentication-type none
use captive-portal wxCP
```

Note, the modes of authentication and encryption remain unchanged (i.e none, which is the default setting for both parameters). Ensure captive-portal-enforcement is enabled on the WLAN.

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA-POLICY</td>
<td>Documents AAA policy configuration mode commands</td>
</tr>
<tr>
<td>dns-whitelist</td>
<td>Documents DNS whitelist configuration mode commands</td>
</tr>
<tr>
<td>captive portal</td>
<td>Documents captive portal configuration mode commands</td>
</tr>
<tr>
<td>wlan</td>
<td>Documents WLAN configuration mode commands</td>
</tr>
</tbody>
</table>
4.1.30 clear

Global Configuration Commands

Clears parameters, cache entries, table entries, and other similar entries. The clear command is available for specific commands only. The information cleared using this command varies depending on the mode where executed.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

clear event-history

Parameters

- event-history

<table>
<thead>
<tr>
<th>event-history</th>
<th>Clears the event history file</th>
</tr>
</thead>
</table>

Examples

rfs4000-229D58#show event-history
EVENT HISTORY REPORT
Generated on '2015-04-23 16:41:27 IST' by 'admin'

2015-04-23 16:41:21       rfs4000-229D58 SYSTEM LOGIN Successfully
logged in user 'admin' with privilege 'superuser' from 'ssh'
2015-04-23 16:09:38       rfs4000-229D58 SYSTEM LOGOUT Logged out user
'admin' with privilege 'superuser' from '192.168.100.208'
2015-04-23 16:09:29       rfs4000-229D58 SYSTEM LOGIN Successfully
logged in user 'admin' with privilege 'superuser' from 'ssh'
2015-04-23 11:09:20       rfs4000-229D58 SYSTEM CONFIG_REVISION Configuration revision updated to 5 from 4
Reason: 'reload' command issued from CLI (user: admin) Timestamp: Apr 23 06:01:48 2015
2015-04-23 11:07:19       rfs4000-229D58 SYSTEM CONFIG_COMMIT Configuration
commit by user 'cfgd' (read startup-config) from '127.0.0.1'
2015-04-23 11:07:19       rfs4000-229D58 LICMGR LIC_REMOVED ADSEC license removed
--More--
rfs4000-229D58#

rfs4000-229D58#clear event-history

rfs4000-229D58#show event-history
EVENT HISTORY REPORT
Generated on '2015-04-23 16:42:24 IST' by 'admin'

rfs4000-229D58#
4.1.31 client-identity

- **Global Configuration Commands**

With an increase in *Bring Your Own Device* (BYOD) corporate networks, there is a parallel increase in the number of possible attack scenarios within the network. BYOD devices are inherently unsafe, as the organization’s security mechanisms do not extend to these personal devices deployed in the corporate wireless network. Organizations can protect their network by limiting how and what these BYODs can access on and through the corporate network.

Device fingerprinting assists administrators by controlling how BYOD devices access a corporate wireless domain. Device fingerprinting uses DHCP options sent by the client in request or discover packets to derive a unique signature specific to device class. For example, Apple devices have a different signature from Android devices. The signature is used to classify the devices and assign permissions and restrictions on each device class.

The following table summarizes the commands available for creating and configuring a set of new client identity parameters:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>client-identity</td>
<td>Creates a new client identity and enters its configuration mode</td>
<td>page 4-122</td>
</tr>
<tr>
<td>client-identity-mode</td>
<td>Invokes the client identity policy configuration mode commands</td>
<td>page 4-124</td>
</tr>
<tr>
<td>client-identity-group</td>
<td>Creates a new client identity group and enters its configuration mode</td>
<td>page 4-129</td>
</tr>
</tbody>
</table>
4.1.31.1 client-identity

- client-identity

Creates a new client identity and enters its configuration mode. Client identity is a set of unique fingerprints used to identify a class of devices. This information is used to configure permissions and access rules for the identified class of devices in the network. The client-identity feature enables device fingerprinting.

Device fingerprinting is a technique of collecting, analyzing, and identifying traffic patterns originating from remote computing devices. When enabled, device fingerprinting helps to identify a wireless client’s device type. There are two methods of fingerprinting devices: Active and Passive.

Active fingerprinting is based on the fact that traffic patterns vary with varying device types. It involves the sending of requests (HTTP, etc.) to devices (clients) and analyzing their response to determine the device type. For example, an invalid request is sent to a device, and its error response is analyzed to identify the device type. Since active device fingerprinting involves sending of packets, the probability of the network getting flooded is very high, especially when many devices are being fingerprinted simultaneously.

Passive fingerprinting involves monitoring of devices to check for known traffic patterns specific to devices based on the protocol, driver implementation, etc. This method accurately classifies a client’s TCP/IP configuration, OS fingerprints, wireless settings etc. No packets are sent to the device. Some of the commonly used protocols for passive device fingerprinting are, TCP, DHCP, HTTP, etc.

This feature implements DHCP device fingerprinting, which relies on specific information sent by a wireless client when acquiring IP address and other configuration information from a DHCP server. The feature uses the DHCP options sent by the wireless client in the DHCP request or discover packets to derive a unique signature specific to the class of devices. For example, Apple devices have a different signature than Android devices. This unique signature can then be used to classify the devices and assign permissions and restrictions on each device class.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
client-identity <CLIENT-IDENTITY-NAME>

Parameters
- client-identity <CLIENT-IDENTITY-NAME>

<table>
<thead>
<tr>
<th>client-identity &lt;CLIENT-IDENTITY-NAME&gt;</th>
<th>Creates a new client identity policy and enters its configuration mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;CLIENT-IDENTITY-NAME&gt;</td>
<td>Specify a client identity policy name. If the client identity policy does not exist, it is created.</td>
</tr>
</tbody>
</table>

Usage Guidelines
The following points should be considered when configuring the client identity (device fingerprinting) feature:

1. Ensure that DHCP is enforced on the WLANs. For more information on enforcing DHCP on WLANs, see enforce-dhcp.

2. Successful identification of different device types depends on the uniqueness of the configured fingerprints. DHCP fingerprinting identifies clients based on the patterns (fingerprints) in the DHCP discover and request messages sent by clients. If different operating systems have the same fingerprints, it will be difficult to identify the device type.

3. When associating client identities with a role policy, ensure that the profile/device, under which the role policy is being used, also has an associated client identity group (containing all the client identities used by the role policy).
Examples

rfs4000-229D58(config)#client-identity test
rfs4000-229D58(config-client-identity-test)#?
Client Identity Mode commands:
dhcp                     Add a DHCP option based match criteria
dhcp-match-message-type  Specify DHCP message type to match
no                       Negate a command or set its defaults
clrscr                   Clears the display screen
commit                   Commit all changes made in this session
do                       Run commands from Exec mode
end                      End current mode and change to EXEC mode
exit                     End current mode and down to previous mode
help                     Description of the interactive help system
revert                   Revert changes
service                  Service Commands
show                     Show running system information
write                    Write running configuration to memory or terminal

rfs4000-229D58(config-client-identity-test)#
4.1.31.2 client-identity-mode commands

The following table summarizes client identity configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcp</td>
<td>Configures the DHCP option match criteria for device fingerprinting</td>
<td>page 4-125</td>
</tr>
<tr>
<td>dhcp-match-message-type</td>
<td>Configures the DHCP message type for device fingerprinting</td>
<td>page 4-127</td>
</tr>
<tr>
<td>no</td>
<td>Removes the DHCP option (used for client identification) configurations</td>
<td>page 4-128</td>
</tr>
</tbody>
</table>
4.1.31.2.1 dhcp

**client-identity-mode commands**

Configures the DHCP option match criteria (signature) for the discover and request message types received from wireless clients.

When accessing a network, DHCP discover and request messages are passed between wireless clients and the DHCP server. These messages contain DHCP options and option values that differ from device to device and are based on the DHCP implementation in the device’s *operating system* (OS). Options and option values contained in a client’s messages are parsed and compared against the configured DHCP option values to identify the device. Once a device type is identified, the wireless client database is updated with the discovered device type.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
dhcp <1-16> message-type [discover|request] [option|option-codes]
dhcp <1-16> message-type [discover|request] [option <1-254>|option-codes]
    [contains|exact|starts-with] [ascii|hexstring] <WORD>
```

**Parameters**

- `dhcp <1-16>` Adds a DHCP option match criteria signature
  - `<1-16>` – Specify an index for this DHCP match criteria from 1 - 16.
  - **Note:** A maximum of 16 match criteria can be configured.

- `message-type [discover|request]` Specifies the message type to which this DHCP match criteria is applicable
  - `discover` – Applies this match criteria to DHCP discover messages only. Indicates that the fingerprint is only checked with any DHCP discover messages received from any device.
  - `request` – Applies this match criteria to DHCP request messages only. Indicates that the fingerprint is only checked with any DHCP request messages received from any device.
  - **Note:** It is recommended to configure client-identity with request messages, because clients rarely send discover messages.
  - **Note:** If the message type is not specified, the fingerprint is checked with all message types (DHCP request and DHCP discover).

- `option <1-254>` The following keywords are common to the ‘discover’ and ‘request’ message types:
  - `option` – Configures a DHCP option value, which is used as the match criteria
  - `<1-254>` – Configures a code for this DHCP option from 1 - 254 (except option 53)

- `option-codes` The following keyword is common to the ‘discover’ and ‘request’ message types:
  - `option-codes` – Matches criteria based on the DHCP option codes contained in the client’s discover/request messages
  - **Note:** Devices pass options in their DHCP discover/request messages as option codes, option types, and option value sets. These option codes are extracted and matched against the configured DHCP option codes and a fingerprint is derived. This derived fingerprint is used to identify the device.
Usage Guidelines
The following DHCP options are useful for identifying different device types:

1. **Option 55**: Used by a DHCP client to request values for specific configuration parameters. It is a list of DHCP option codes and can be in the client’s order of preference.
2. **Client configured list of DHCP options** (all options parsed into a hex string).
3. **Option 60**: Vendor class identifier. Used to identify the vendor and functionality of a DHCP client (some devices do not set the value of this field).

Though it is possible to use any option to configure a device fingerprint, the use of a combination of one or more of the preceding options to define a device is recommended.

Examples

```bash
rfs4000-229D58(config-client-identity-test)#dhcp 1 message-type request option 60 exact ascii MSFT\5.0
rfs4000-229D58(config-client-identity-test)#dhcp 2 message-type discover option 2 exact hexstring 012456c22c44
```

```bash
rfs4000-229D58(config-client-identity-test)#show context client-identity test
dhcp 2 message-type discover option 2 exact hexstring 012456c22c44
dhcp 1 message-type request option 60 exact ascii MSFT5.0
```

Related Commands

| no | Removes a DHCP option signature (match criteria) |
4.31.2.2  dhcp-match-message-type

client-identity-mode commands

Configures the DHCP message type to match

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dhcp-match-message-type [all|any|discover|request]

Parameters

- dhcp-match-message-type [all|any|discover|request]

| dhcp-match-message-type [all|any|discover|request] | Specifies the DHCP message type to consider for matching |
|-----------------------------------------------------|--------------------------------------------------------|
| • all – Matches all message types: discover and request. Indicates that the fingerprint is checked with both the DHCP request and the DHCP discover message. |
| • any – Matches any message type: discover or request. Indicates that the fingerprint is checked with either the DHCP request or the DHCP discover message. |
| • discover – Matches discover messages only. Client matches the client identity only if the discover message sent by the client matches. Values configured for request messages are ignored. |
| • request – Matches request messages only. Client matches the client identity only if the request message sent by the client matches. Values configured for discover messages are ignored. |

Examples

rfs4000-229D58(config-client-identity-test)#dhcp-match-message-type all

rfs4000-229D58(config-client-identity-test)#show context
client-identity test
dhcp 2 message-type discover option 2 exact hexstring 012456c22c44
dhcp 1 message-type request option 60 exact ascii MSFT5.0
dhcp-match-message-type all
rfs4000-229D58(config-client-identity-test)#

Related Commands

| no | Removes the DHCP message type to match |
4.1.31.2.3 no

Removes the DHCP options match criteria configurations

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [dhcp <1-16>|dhcp-match-message-type]

Parameters

- no [dhcp <1-16>|dhcp-match-message-type]

| dhcp <1-16> | Removes the DHCP option match criteria rule identified by the <1-16> keyword
| dhcp-match-message-type | Removes the DHCP message type to match

Examples

The following example shows the client identity ‘test’ settings before the ‘no’ commands are executed:

```
rfs4000-229D58(config-client-identity-test)#show context
client-identity test
dhcp 2 message-type discover option 2 exact hexstring 012456c22c44
dhcp 1 message-type request option 60 exact ascii MSFT5.0
dhcp-match-message-type all
rfs4000-229D58(config-client-identity-test)#
```

The following example shows the client identity ‘test’ settings after the ‘no’ commands are executed:

```
rfs4000-229D58(config-client-identity-test)#no dhcp 2
rfs4000-229D58(config-client-identity-test)#no dhcp-match-message-type
rfs4000-229D58(config-client-identity-test)#show context
client-identity test
dhcp 1 message-type request option 60 exact ascii MSFT5.0
rfs4000-229D58(config-client-identity-test)#
```

Related Commands

| dhcp | Configures the DHCP option match criteria for device fingerprinting |
| dhcp-match-message-type | Configures the DHCP message type for device fingerprinting |
4.1.32 client-identity-group

The following table summarizes commands available to enter the client identity group configuration mode:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>client-identity-group</td>
<td>Creates a new client identity group and enters its configuration mode</td>
<td>page 4-130</td>
</tr>
<tr>
<td>client-identity</td>
<td>Creates new client identity policy and enters its configuration mode</td>
<td>page 4-121</td>
</tr>
<tr>
<td>client-identity-group-mode commands</td>
<td>Invokes the client identity group configuration mode commands</td>
<td>page 4-131</td>
</tr>
</tbody>
</table>
4.1.32.1 client-identity-group

- **client-identity-group**

  Configures a new client identity group

  A client identity group is a collection of client identities. Each client identity included in a client identity group is set a priority value that indicates the priority for that identity when device fingerprinting.

  Device Fingerprinting relies on specific information sent by a wireless client when acquiring IP address and other configuration information from a DHCP server. The feature uses the DHCP options sent by the wireless client in the DHCP request or discover packets to derive a unique signature specific to the class of devices. For example, Apple devices have a different signature than Android devices. This unique signature can then be used to classify the devices and assign permissions and restrictions on each device class.

  A client identity group can be attached to a profile or device, enabling device fingerprinting on them.

  Supported in the following platforms:
  
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
client-identity-group <CLIENT-IDENTITY-GROUP-NAME>
```

**Parameters**

- **client-identity-group <CLIENT-IDENTITY-GROUP-NAME>**

| client-identity-group <CLIENT-IDENTITY-GROUP-NAME> | Creates a new client identity group and enters its configuration mode
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;CLIENT-IDENTITY-GROUP-NAME&gt;</td>
<td>Specify a client identity group name. If the group does not exist, it is created.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config)#client-identity-group test
rfs4000-229D58(config-client-identity-group-test)#
```

Client Identity group Mode commands:

- **client-identity** Client identity (DHCP Device Fingerprinting)
- **no** Negate a command or set its defaults
- **clrscr** Clears the display screen
- **commit** Commit all changes made in this session
- **do** Run commands from Exec mode
- **end** End current mode and change to EXEC mode
- **exit** End current mode and down to previous mode
- **help** Description of the interactive help system
- **revert** Revert changes
- **service** Service Commands
- **show** Show running system information
- **write** Write running configuration to memory or terminal

```
rfs4000-229D58(config-client-identity-group-test)#
```
4.1.32.2 client-identity-group-mode commands

The following table summarizes client identity group configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>client-identity</td>
<td>Associates an existing and configured client identity (device fingerprint) with this client identity group</td>
<td>page 4-132</td>
</tr>
<tr>
<td>no</td>
<td>Removes the client identity associated with this client identity group</td>
<td>page 4-128</td>
</tr>
</tbody>
</table>
4.1.32.2.1 client-identity

**client-identity-group-mode commands**

Associates an existing and configured client identity (device fingerprint) with this client identity group

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

client-identity <CLIENT-IDENTITY-NAME> precedence <1-10000>

**Parameters**
- **client-identity** <CLIENT-IDENTITY-NAME> precedence <1-10000>

<table>
<thead>
<tr>
<th>client-identity &lt;CLIENT-IDENTITY-NAME&gt;</th>
<th>Associates a client identity with this group</th>
</tr>
</thead>
<tbody>
<tr>
<td>precedence &lt;1-10000&gt;</td>
<td>Determines the order in which client identity is used.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The client identity rule is applied based on its precedence value. Lower the value, higher is the precedence. Therefore, a client identity with precedence 5 gets precedence over a client identity having precedence 20.</td>
</tr>
</tbody>
</table>

**Examples**
The following example shows two client identities created and configured:

```
rfs4000-229D58(config)#show context
!
! Configuration of RFS4000 version 5.8.4.0-004D
!
! version 2.5
!
client-identity TestClientIdentity
dhcp 1 message-type request option-codes exact hexstring 5e4d36780b3a7f
!
client-identity test
dhcp 2 message-type discover option 2 exact hexstring 012456c22c44
dhcp 1 message-type request option 60 exact ascii MSFT5.0
dhcp-match-message-type all
!
client-identity-group ClientIdentityGroup
client-identity TestClientIdentity precedence 1
!
client-identity-group test
!
```

ip access-list BROADCAST-MULTICAST-CONTROL
permit tcp any any rule-precedence 10 rule-description "permit all TCP traffic"
--More--
rfs4000-229D58(config)#
The following example associates client identity 'test' with the client identity group 'test':

```bash
rfs4000-229D58(config-client-identity-group-test)#client-identity test precedence 1
```

The following example shows the client identity group 'test' with two associated client identities having precedence 1 and 2:

```bash
rfs4000-229D58(config-client-identity-group-test)#client-identity TestClientIdentity precedence 2
rfs4000-229D58(config-client-identity-group-test)#show context
client-identity-group test
  client-identity TestClientIdentity precedence 1
  client-identity test precedence 1
rfs4000-229D58(config-client-identity-group-test)#
```

The following example shows the possible client identities:

```bash
rfs4000-229D58(config)#show context

! Configuration of RFS4000 version 5.8.4.0-004D
!
version 2.5
!
client-identity Android-2-2
dhcp 1 message-type request option 55 exact hexstring 01792103061c333a3b
dhcp 6 message-type request option 60 exact ascii "dhcpcd 4.0.15"
!
client-identity Android-2-3
dhcp 3 message-type request option 55 exact hexstring 01792103061c333a3b
dhcp 6 message-type request option 60 exact ascii "dhcpcd 4.0.15"
dhcp 1 message-type request option-codes exact hexstring 353d32393c37
dhcp 2 message-type request option-codes exact hexstring 353d3236393c37
dhcp 10 message-type request option-codes exact hexstring 353d3236393c0c37
!
client-identity Android-2-3-x
dhcp 10 message-type request option 55 exact hexstring 01792103060f1c333a3b77
dhcp 11 message-type request option 55 exact hexstring 01792103060f1c2c333a3b77
dhcp 12 message-type request option 60 exact ascii "dhcpcd 4.0.15"
!
client-identity Android-3
dhcp 4 message-type request option 55 exact hexstring 012103061c333a3b
dhcp 5 message-type request option 60 starts-with ascii dhcpcd-5.2.10
dhcp 6 message-type request option-codes exact hexstring 3532393c0c37
dhcp 7 message-type request option-codes exact hexstring 35393c0c37
dhcp 8 message-type request option-codes exact hexstring 353236393c0c37
!
client-identity Android-4
dhcp 8 message-type request option 55 exact hexstring 012103061c333a3b
dhcp 9 message-type request option 60 starts-with ascii dhcpcd-5.2.10
!
client-identity Android-4-1-x
dhcp 1 message-type request option 55 exact hexstring 012103060f1c333a3b
dhcp 2 message-type request option 60 exact ascii dhcpcd-5.2.10
!
client-identity Android-4-2-x
dhcp 1 message-type request option 55 exact hexstring 012103060f1c333a3b
dhcp 2 message-type request option 60 exact ascii dhcpcd-5.5.6
!
client-identity Galaxy-Note
dhcp 8 message-type request option 55 exact hexstring 012103061c333a3b
dhcp 9 message-type request option 60 exact ascii dhcpcd-5.2.10:Linux-3.0.15-N7000DDLP8-CL551076:armv7l:SMDK4210
!
client-identity Galaxy-Tab
dhcp 8 message-type request option 55 exact hexstring 012103061c333a3b
dhcp 9 message-type request option 60 exact ascii dhcpcd-5.2.10:Linux-2.6.36.3:armv7l:p3


```
dhcp 10 message-type request option-codes exact hexstring 353d3236393c0c37
dhcp 11 message-type request option-codes exact hexstring 353d32393c0c37
!
client-identity Mac-OS-X
  dhcp 3 message-type request option 55 exact hexstring 0103060f775ffcc2c2e2f
!
client-identity Ubuntu-11
  dhcp 2 message-type request option 55 exact hexstring 011c02030f06770c2f1a792a79f9f2c2
  dhcp 1 message-type request option-codes exact hexstring 3536320c37
  dhcp 3 message-type request option-codes exact hexstring 350c37
  dhcp 5 message-type request option-codes exact hexstring 35320c37
!
client-identity Windows-7
  dhcp 2 message-type request option 55 exact hexstring 010f03062c2f1f2179f92b
  dhcp 9 message-type request option 60 exact ascii "MSFT 5.0"
!
client-identity Windows-8
  dhcp 1 message-type request option 55 exact hexstring 010f03062c2f1f2179f92b
  dhcp 5 message-type request option 60 exact ascii "MSFT 5.0"
!
client-identity Windows-Phone-7-5
  dhcp 11 message-type request option 55 exact hexstring 0103060f2c2f1f21f92b
  dhcp 12 message-type request option-codes exact hexstring 3536323d37
!
client-identity Windows-XP
  dhcp 4 message-type request option 55 exact hexstring 010f03062c2f1f21f92b
  dhcp 5 message-type request option 60 exact ascii "MSFT 5.0"
!
client-identity-group default
  client-identity Windows-XP precedence 100
  client-identity Windows-7 precedence 200
  client-identity Android-2-3 precedence 300
  client-identity Android-2-2 precedence 400
  client-identity Android-2-3-x precedence 500
  client-identity Galaxy-Tab precedence 600
  client-identity Android-3 precedence 800
  client-identity Galaxy-Note precedence 900
  client-identity Android-4 precedence 1000
  client-identity iPhone-iPad precedence 1100
  client-identity Ubuntu-11 precedence 1200
  client-identity Windows-Phone-7-5 precedence 1300
  client-identity Windows-8 precedence 1500
  client-identity Mac-OS-X precedence 1600
  client-identity Android-4-1-X precedence 1700
  client-identity Android-4-2-X precedence 1800
!
--More--
```

Related Commands

```
no | Removes the client identity associated with the client identity group
```
4.1.32.2.2 no

*client-identity-group-mode commands*

Removes the client identity associated with the client identity group

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

no client-identity <CLIENT-IDENTITY-NAME>

**Parameters**

- no client-identity <CLIENT-IDENTITY-NAME>

<table>
<thead>
<tr>
<th>no client-identity &lt;CLIENT-IDENTITY-NAME&gt;</th>
<th>Disassociates a specified client identity from this client identity group</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;CLIENT-IDENTITY-NAME&gt;</td>
<td><em>Specify the client identity name.</em></td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs4000-229D58(config-client-identity-group-test)#show context
client-identity-group test
rfs4000-229D58(config-client-identity-group-test)#

rfs4000-229D58(config-client-identity-group-test)#no client-identity test
rfs4000-229D58(config)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>client-identity</th>
<th>Associates an existing and configured client identity (device fingerprinting) with this client identity group</th>
</tr>
</thead>
</table>

4.1.33 clone

Global Configuration Commands

Creates a replica of an existing object or device. The configuration of the new object or device is an exact copy of the existing object or device configuration. Use this command to copy existing configurations and then modifying only the required parameters.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

clone [TLO|device]

clone TLO <EXISTING-OBJECT-NAME> <NEW-OBJECT-NAME>

clone device <EXISTING-DEVICE-MAC/NAME> <NEW-DEVICE-MAC>

Parameters

- clone TLO <EXISTING-OBJECT-NAME> <NEW-OBJECT-NAME>
  - TLO <EXISTING-OBJECT-NAME> <NEW-OBJECT-NAME>
    - Creates a new TLO by cloning an existing top-level object. The new object has the same configuration as the cloned object.
    - <EXISTING-OBJECT-NAME> – Specify the existing object’s (to be cloned) name
    - <NEW-OBJECT-NAME> – Provide the new object’s name.
    - Note: Enter clone and press Tab to list objects available for cloning.

- clone device <EXISTING-DEVICE-MAC/NAME> <NEW-DEVICE-MAC>
  - device <EXISTING-DEVICE-MAC/NAME> <NEW-DEVICE-MAC>
    - Configures a new device based on an existing device configuration
    - <EXISTING-DEVICE-MAC/NAME> – Specify the existing device’s name or MAC address (the device to be cloned)
    - <NEW-DEVICE-MAC> – Provide the new device’s MAC address.
    - Note: Enter clone > device and press Tab to list devices available for cloning.

Examples

nx9500-6C8809(config)#clone rf_domain TechPubs Cloned_TechPubs2
nx9500-6C8809(config)#show context

rf-domain TechPubs
  location SanJose
  timezone America/Los_Angeles
  country-code us

rf-domain Cloned_TechPubs2
  location SanJose
  --More--

nx9500-6C8809(config)#
4.1.34 crypto-cmp-policy

- **Global Configuration Commands**

  Creates a crypto Certificate Management Protocol (CMP) policy and enters its configuration mode

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP91XX, AP92XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
crypto-cmp-policy <CRYPTO-CMP-POLICY-NAME>
```

**Parameters**

- `crypto-cmp-policy <CRYPTO-CMP-POLICY-NAME>`

**Examples**

```
nx9500-6C8809(config)#crypto-cmp-policy CMP
nx9500-6C8809(config-cmp-policy-CMP)#?
```

**CMP Policy Mode commands:**

- `ca-server` CMP CA Server configuration commands
- `cert-key-size` Set key size for certificate request
- `cert-renewal-timeout` Trigger a cert renewal request on timeout
- `cross-cert-validate` Validate cross-cert using factory-cert
- `no` Negate a command or set its defaults
- `subjectAltName` Configure subjectAltName value
- `trustpoint` Trustpoint for CMP
- `use` Set setting to use

```
clrscr
commit
do
end
exit
help
revert
service
show
write
```

```
nx9500-6C8809(config-cmp-policy-CMP)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets values or disables commands</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on the crypto CMP policy, see *Chapter 29, CRYPTO-CMP-POLICY.*
4.1.35 customize

Global Configuration Commands

Customizes the output of the summary CLI commands. Use this command to define the data displayed as a result of various show commands.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

customize [cdp-lldp-info-column-width|hostname-column-width] <1-64>
customize show-adoption-status (adopted-by, ap-name <1-64>, cdp-lldp-info, config-status, last-adoption, msgs, uptime, version)
customize show-wireless-client (ap-name <1-64>, auth, client-identity <1-32>, bss, enc, hostname <1-64>, ip, last-active, location <1-64>, mac, radio-alias <3-67>, radio-id, radio-type, role <1-32>, state, username <1-64>, vendor, vlan, wlan)
customize show-wireless-client-stats (hostname <1-64>, mac, rx-bytes, rx-errors, rx-packets, rx-throughput, t-index, tx-bytes, tx-dropped, tx-packets, tx-throughput)
customize show-wireless-client-stats-rf (average-retry-number, error-rate, hostname <1-64>, mac, noise, q-index, rx-rate, signal, snr, tx-rate)
customize show-wireless-meshpoint-accelerated-multicast (ap-hostname, group-addr, mesh-name, neighbor-hostname, neighbor-ifid, radio-alias, radio-id, radio-mac, subscriptions)
customize show-wireless-meshpoint (ap-mac, cfg-as-root, hops, hostname <1-64>, interface-ids, is-root, mesh-name <1-64>, mpid, next-hop-hostname <1-64>, next-hop-ifid, next-hop-use-time, path-metric, root-bound-time, root-hostname <1-64>, root-mpid)
customize show-wireless-meshpoint-neighbor-stats (ap-hostname <1-64>, neighbor-hostname <1-64>, neighbor-ifid, rx-bytes, rx-errors, rx-packets, rx-throughput, t-index, tx-bytes, tx-dropped, tx-packets, tx-throughput)
customize show-wireless-meshpoint-neighbor-stats-rf (ap-hostname <1-64>, average-retry-number, error-rate, neighbor-hostname <1-64>, neighbor-ifid, noise, q-index, rx-rate, signal, snr, t-index, tx-rate)
customize show-wireless-mint-client (client-alias <1-64>, client-bss, portal-alias <1-64>, portal-bss, up-time)
customize show-wireless-mint-client-stats (client-alias <1-64>, portal-alias <1-64>, portal-bss, rx-bytes, rx-errors, rx-packets, rx-throughput, t-index, tx-bytes, tx-dropped, tx-packets, tx-throughput)
customize show-wireless-mint-client-stats-rf (average-retry-number, client-alias <1-64>, error-rate, noise, portal-alias <1-64>, portal-bss, q-index, rx-rate, signal, snr, tx-rate)
customize show-wireless-mint-portal (client-alias <1-64>, client-bss, portal-alias <1-64>, portal-bss, up-time)

customize show-wireless-mint-portal-stats (client-alias <1-64>, client-bss, portal-alias <1-64>, rx-bytes, rx-errors, rx-packets, rx-throughput, t-index, tx-bytes, tx-dropped, tx-packets, tx-throughput)

customize show-wireless-mint-portal-stats-rf (average-retry-number, client-alias <1-64>, client-bss, error-rate, noise, portal-alias <1-64>, q-index, rx-rate, signal, snr, tx-rate)

customize show-wireless-radio (adopt-to, ap-name <1-64>, channel, location <1-64>, num-clients, power, radio-alias <3-67>, radio-id, radio-mac, rf-mode, state)

customize show-wireless-radio-stats (radio-alias <3-67>, radio-id, radio-mac, rx-bytes, rx-errors, rx-packets, rx-throughput, tx-bytes, tx-dropped, tx-packets, tx-throughput)

customize show-wireless-radio-stats-rf (average-retry-number, error-rate, noise, q-index, radio-alias <3-67>, radio-id, radio-mac, rx-rate, signal, snr, t-index, tx-rate)

**Parameters**

- customize [cdp-lldp-info-column-width|hostname-column-width] <1-64>
  
  hostname-column-width <1-64>  |  Configures default width of the hostname column in all show command outputs  
  • <1-64> – Sets the hostname column width from 1 - 64 characters  

  cdp-lldp-info-column-width <1-64>  |  Configures the column width in the `show > cdp/lldp > [neighbor|report]` command output  
  • <1-64> – Sets the column width from 1 - 64 characters  

- customize show-adoption-status (adopted-by, ap-name <1-64>, cdp-lldp-info, config-status, last-adoption, msgs, uptime, version)

  show-adoption-status  |  Configures the information displayed in the `show > adoption > status` command output. Select the columns (information) displayed from the following options: adopted-by, ap-name, cdp-lldp-info, config-status, last-adoption, msgs, uptime, and version. These are recursive parameters and you can select multiple options at a time.  
  **Note:** The columns displayed by default are: Device-Name, Version, Config-Status, MSGS, Adopted-By, Last-Adoption, and Uptime.  
  **Note:** Where ever available, you can optionally use the <1-64> parameter to set the column width.

- customize show-wireless-client (ap-name <1-64>, auth, client-identity <1-32>, bss, enc, hostname <1-64>, ip, last-active, location <1-64>, mac, radio-alias <3-67>, radio-id, radio-type, role <1-32>, state, username <1-64>, vendor, vlan, wlan)

  show-wireless-client  |  Customizes the `show > wireless > client` command output  
  **Note:** The columns displayed by default are: MAC, IPv4, Vendor, Radio-ID, WLAN, VLAN, and State.  

  ap-name <1-64>  |  Includes the ap-name column, which displays the name of the AP with which this client associates  
  • <1-64> – Sets the ap-name column width from 1 - 64 characters  

  auth  |  Includes the auth column, which displays the authorization protocol used by the wireless client  

  client-identity <1-32>  |  Includes the client-identity (device type) column, which displays details gathered from DHCP device fingerprinting feature (when enabled). For more information, see `client-identity`.  
  • <1-32> – Sets the client-identity column width from 1 - 32 characters
<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bss</td>
<td>Includes the BSS column, which displays the BSS ID the wireless client is associated with</td>
</tr>
<tr>
<td>enc</td>
<td>Includes the enc column, which displays the encryption suite used by the wireless client</td>
</tr>
<tr>
<td>hostname &lt;1-64&gt;</td>
<td>Includes the hostname column, which displays the wireless client’s hostname</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-64&gt; – Sets the hostname column width from 1 - 64 characters</td>
</tr>
<tr>
<td>ip</td>
<td>Includes the IP column, which displays the wireless client’s current IP address</td>
</tr>
<tr>
<td>last-active</td>
<td>Includes the last-active column, which displays the time of last activity seen from the wireless client</td>
</tr>
<tr>
<td>location &lt;1-64&gt;</td>
<td>Includes the location column, which displays the location of the client’s associated access points</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-64&gt; – Sets the location column width from 1 - 64 characters</td>
</tr>
<tr>
<td>mac</td>
<td>Includes the MAC column, which displays the wireless client’s MAC address</td>
</tr>
<tr>
<td>radio-alias &lt;3-67&gt;</td>
<td>Includes the radio-alias column, which displays the radio alias with the AP’s hostname and radio interface number in the “HOSTNAME:RX” format</td>
</tr>
<tr>
<td></td>
<td>• &lt;3-64&gt; – Sets the radio-alias column width from 3 - 67 characters</td>
</tr>
<tr>
<td>radio-id</td>
<td>Includes the radio-id column, which displays the radio ID with the AP’s MAC address and radio interface number in the “AA-BB-CC-DD-EE-FF:RX” format</td>
</tr>
<tr>
<td>radio-type</td>
<td>Includes the radio-type column, which displays the wireless client’s radio type</td>
</tr>
<tr>
<td>role &lt;1-32&gt;</td>
<td>Includes the role column, which displays the client’s role</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-32&gt; – Sets the role column width from 1 - 32 characters</td>
</tr>
<tr>
<td>state</td>
<td>Includes the state column, which displays the wireless client’s current availability state</td>
</tr>
<tr>
<td>username &lt;1-64&gt;</td>
<td>Includes the username column, which displays the wireless client’s username</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-64&gt; – Specify the username column width from 1 - 64 characters.</td>
</tr>
<tr>
<td>vendor</td>
<td>Includes the vendor column, which displays the wireless client’s vendor ID</td>
</tr>
<tr>
<td>vlan</td>
<td>Includes the VLAN column, which displays the wireless client’s assigned VLAN</td>
</tr>
<tr>
<td>wlan</td>
<td>Includes the WLAN column, which displays the wireless client’s assigned WLAN</td>
</tr>
</tbody>
</table>

- customize show-wireless-client-stats (hostname <1-64>, mac, rx-bytes, rx-errors, rx-packets, rx-throughput, t-index, tx-bytes, tx-dropped, tx-packets, tx-throughput)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show-wireless-client-stats</td>
<td>Customizes the show &gt; wireless &gt; client &gt; statistics command output</td>
</tr>
<tr>
<td>Note: The columns displayed by default are: MAC, Tx bytes, RX bytes, Tx pkts, Rx pkts, and Tx bps, RX bps, T-Index, and Dropped pkts.</td>
<td></td>
</tr>
<tr>
<td>hostname &lt;1-64&gt;</td>
<td>Includes the hostname column, which displays the wireless client’s hostname</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-64&gt; – Sets the hostname column width from 1 - 64 characters</td>
</tr>
<tr>
<td>mac</td>
<td>Includes the MAC column, which displays the wireless client’s MAC address</td>
</tr>
<tr>
<td>rx-bytes</td>
<td>Includes the rx-bytes column, which displays the total number of bytes received by the wireless client</td>
</tr>
<tr>
<td>rx-errors</td>
<td>Includes the rx-error column, which displays the total number of errors received by the wireless client</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>rx-packets</td>
<td>Includes the rx-packets column, which displays the total number of packets received by the wireless client</td>
</tr>
<tr>
<td>rx-throughput</td>
<td>Includes the rx-throughput column, which displays the receive throughput at the wireless client</td>
</tr>
<tr>
<td>t-index</td>
<td>Includes the t-index column, which displays the traffic utilization index at the particular wireless client</td>
</tr>
<tr>
<td>tx-bytes</td>
<td>Includes the tx-bytes column, which displays the total number of bytes transmitted by the wireless client</td>
</tr>
<tr>
<td>tx-dropped</td>
<td>Includes the tx-dropped column, which displays the total number of dropped packets by the wireless client</td>
</tr>
<tr>
<td>tx-packets</td>
<td>Includes the tx-packets column, which displays the total number of packets transmitted by the wireless client</td>
</tr>
<tr>
<td>tx-throughput</td>
<td>Includes the tx-throughput column, which displays the transmission throughput at the wireless client</td>
</tr>
</tbody>
</table>

- customize show-wireless-client-stats-rf (average-retry-number, error-rate, host-name <1-64>, mac, noise, q-index, rx-rate, signal, snr, tx-rate)

- show-wireless-client-stats-rf Customizes the show > wireless > client > statistics > rf command output

**Note:** The columns displayed by default are: MAC, Signal (dBm), Noise (dBm), SNR (dB), TX Rate (Mbps), Retry Avg, Errors (pps), and Q-Index (%).

- average-retry-number Includes the average-retry-number column, which displays the average number of retransmissions made per packet

- error-rate Includes the error-rate column, which displays the rate of error for the wireless client

- hostname <1-64> Includes the hostname column, which displays the wireless client’s hostname
  - <1-64> – Sets the hostname column width from 1 - 64 characters

- mac Includes the MAC column, which displays the wireless client’s MAC address

- noise Includes the noise column, which displays the noise (in dBm) as detected by the wireless client

- q-index Includes the q-index column, which displays the RF quality index
  - **Note:** Higher values indicate better RF quality.

- rx-rate Includes the rx-rate column, which displays the receive rate at the particular wireless client

- signal Includes the signal column, which displays the signal strength (in dBm) at the particular wireless client

- snr Includes the snr column, which displays the signal to noise (SNR) ratio (in dB) at the particular wireless client

- tx-rate Includes the tx-rate column, which displays the packet transmission rate at the particular wireless client
- customize show-wireless-meshpoint-accelerated-multicast (ap-hostname, group-addr, mesh-name, neighbor-hostname, neighbor-ifid, radio-alias, radio-id, radio-mac, subscriptions)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show-wireless-meshpoint-accelerated-multicast</td>
<td>Configures the information displayed in the show &gt; wireless &gt; meshpoint &gt; accelerated multicast command output. Select the columns (information) displayed from the following options: ap-hostname, group-addr, mesh-name, neighbor-hostname, neighbor-ifid, radio-alias, radio-id, radio-mac, subscriptions. These are recursive parameters and you can select multiple options at a time. <strong>Note:</strong> The columns displayed by default are: Mesh, Radio, Neighbor-IFID, Neighbor-Hostname, Group-MAC, and Subscriptions.</td>
</tr>
</tbody>
</table>

- customize show-wireless-meshpoint (ap-mac, cfg-as-root, hops, hostname <1-64>, interface-ids, is-root, mesh-name <1-64>, mpid, next-hop-hostname <1-64>, next-hop-ifid, next-hop-use-time, path-metric, root-bound-time, root-hostname <1-64>, root-mpid)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show-wireless-meshpoint</td>
<td>Customizes the show &gt; wireless &gt; meshpoint command output. <strong>Note:</strong> The columns displayed by default are: Mesh, Hostname, Hops, Is-Root, Config-As-Root, Root-Hostname, Root-Bound-Time, Path-Metric, Next-Hop-Hostname, and Next-Hop-Use-Time.</td>
</tr>
<tr>
<td>ap-mac</td>
<td>Includes the ap-mac column, which displays the AP’s MAC address in the AA-BB-CC-DD-EE-FF format. Applicable only in case of non-controller meshpoints</td>
</tr>
<tr>
<td>cfg-as-root</td>
<td>Includes the cfg-as-root column, which displays the configured root state of the meshpoint</td>
</tr>
<tr>
<td>hops</td>
<td>Includes the hops column, which displays the number of hops to the root for this meshpoint</td>
</tr>
<tr>
<td>hostname &lt;1-64&gt;</td>
<td>Includes the hostname column, which displays the AP’s hostname. Applicable only in case of non-wireless controller meshpoints • &lt;1-64&gt; – Sets the hostname column width from 1 - 64 characters</td>
</tr>
<tr>
<td>interface-ids</td>
<td>Includes the interface-ids column, which displays the interface identifiers (interfaces used by this meshpoint)</td>
</tr>
<tr>
<td>is-root</td>
<td>Includes the is-root column, which displays the current root state of the meshpoint</td>
</tr>
<tr>
<td>mesh-name &lt;1-64&gt;</td>
<td>Includes the mesh-name column, which displays the meshpoint’s name • &lt;1-64&gt; – Sets the mesh-name column width from 1 - 64 characters</td>
</tr>
<tr>
<td>mpid</td>
<td>Includes the mpid column, which displays the meshpoint identifier in the AA-BB-CC-DD-EE-FF format</td>
</tr>
<tr>
<td>next-hop-hostname &lt;1-64&gt;</td>
<td>Includes the next-hop-hostname column, which displays the next-hop AP’s name (the AP next in the path to the bound root) • &lt;1-64&gt; – Sets the next-hop-hostname column width from 1 - 64 characters</td>
</tr>
<tr>
<td>next-hop-ifid</td>
<td>Includes the next-hop-ifid column, which displays the next-hop interface identifier in the AA-BB-CC-DD-EE-FF format</td>
</tr>
<tr>
<td>next-hop-use-time</td>
<td>Includes the next-hop-use-time column, which displays the time since this meshpoint started using this next hop</td>
</tr>
<tr>
<td>root-bound-time</td>
<td>Includes the root-bound-time column, which displays the time since this meshpoint has been bound to the current root</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>root-hostname &lt;1-64&gt;</strong></td>
<td>Includes the root-hostname column, which displays the root AP's hostname to which this meshpoint is bound&lt;br&gt;• &lt;1-64&gt; – Sets the root-hostname column width from 1 - 64 characters</td>
</tr>
<tr>
<td><strong>root-mpid</strong></td>
<td>Includes the root-mpid column, which displays the bound root meshpoint identifier in the AA-BB-CC-DD-EE-FF format</td>
</tr>
<tr>
<td><strong>customize show-wireless-meshpoint-neighbor-stats</strong>&lt;br&gt;(ap-hostname &lt;1-64&gt;,&lt;br&gt;neighbor-hostname &lt;1-64&gt;,neighbor-ifid,rx-bytes,rx-errors,rx-packets,rx-throughput,&lt;br&gt;t-index,tx-bytes,tx-dropped,tx-packets,tx-throughput)</td>
<td></td>
</tr>
<tr>
<td><strong>show-wireless-meshpoint-neighbor-stats</strong></td>
<td>Customizes the <code>show &gt; wireless &gt; meshpoint &gt; neighbor &gt; statistics</code> command output&lt;br&gt;Note: The columns displayed by default are: AP Hostname, Neighbor-IFID, TX bytes, RX bytes, Tx pkts, Rx pkts, Tx (bps), Rx (bps), T-Index (%), and Dropped pkts.</td>
</tr>
<tr>
<td><strong>ap-name &lt;1-64&gt;</strong></td>
<td>Includes the ap-name column, which displays name of the AP reporting a neighbor&lt;br&gt;• &lt;1-64&gt; – Sets the ap-name column width from 1 - 64 characters</td>
</tr>
<tr>
<td><strong>neighbor-hostname &lt;1-64&gt;</strong></td>
<td>Includes the neighbor-hostname column, which displays the reported neighbor’s hostname&lt;br&gt;• &lt;1-64&gt; – Sets the neighbor-hostname column width from 1 - 64 characters</td>
</tr>
<tr>
<td><strong>neighbor-ifid</strong></td>
<td>Includes the neighbor-ifid column, which displays the neighbor’s interface ID</td>
</tr>
<tr>
<td><strong>rx-bytes</strong></td>
<td>Includes the rx-bytes column, which displays the total bytes received</td>
</tr>
<tr>
<td><strong>rx-errors</strong></td>
<td>Includes the rx-error column, which displays the total bytes of error received</td>
</tr>
<tr>
<td><strong>rx-packets</strong></td>
<td>Includes the rx-packets column, which displays the number of packets received</td>
</tr>
<tr>
<td><strong>rx-throughput</strong></td>
<td>Includes the rx-throughput column, which displays neighbor's received throughput</td>
</tr>
<tr>
<td><strong>t-index</strong></td>
<td>Includes the t-index column, which displays the traffic utilization index at the neighbor end</td>
</tr>
<tr>
<td><strong>tx-bytes</strong></td>
<td>Includes the tx-bytes column, which displays the total bytes transmitted</td>
</tr>
<tr>
<td><strong>tx-dropped</strong></td>
<td>Includes the tx-dropped column, which displays the total bytes dropped</td>
</tr>
<tr>
<td><strong>tx-packets</strong></td>
<td>Includes the tx-packets column, which displays the number of packets transmitted</td>
</tr>
<tr>
<td><strong>tx-throughput</strong></td>
<td>Includes the tx-throughput column, which displays neighbor's transmitted throughput</td>
</tr>
<tr>
<td><strong>customize show-wireless-meshpoint-neighbor-stats-rf</strong>&lt;br&gt;(ap-hostname &lt;1-64&gt;,&lt;br&gt;average-retry-number, error-rate, neighbor-hostname &lt;1-64&gt;, neighbor-ifid, noise, q-index,&lt;br&gt;rx-rate,signal, snr, t-index, tx-rate)</td>
<td></td>
</tr>
<tr>
<td><strong>show-wireless-meshpoint-neighbor-stats-rf</strong></td>
<td>Customizes the <code>show &gt; wireless &gt; meshpoint &gt; neighbor &gt; statistics &gt; rf</code> command output&lt;br&gt;Note: The columns displayed by default are: AP Hostname, Neighbor-IFID, Signal (dBm), Noise (dBm), SNR (dB), Tx-Rate (Mbps), Rx-Rate (Mbps), Retry Avg, Errors (pps), and Q-Index (%).</td>
</tr>
<tr>
<td><strong>ap-name &lt;1-64&gt;</strong></td>
<td>Includes the ap-name column, which displays name of the AP reporting a neighbor&lt;br&gt;• &lt;1-64&gt; – Sets the ap-name column width from 1 - 64 characters</td>
</tr>
<tr>
<td><strong>average-retry-number</strong></td>
<td>Includes the average-retry-number column, which displays the average number of retransmissions made per packet.</td>
</tr>
<tr>
<td><strong>error-rate</strong></td>
<td>Includes the error-rate column</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>show-wireless-mint-client</td>
<td>Configures the information displayed in the <code>show &gt; wireless &gt; mint &gt; client</code> command output. Select the columns (information) displayed from the following options: client-alias, client-bss, portal-alias, portal-bss, and up-time. These are recursive parameters and you can select multiple options at a time. <strong>Note:</strong> The columns displayed by default are: Portal, Portal-Radio-MAC, Client, Client-Radio-MAC, and Up-Time.</td>
</tr>
<tr>
<td>show-wireless-mint-client-stats</td>
<td>Configures the information displayed in the <code>show &gt; wireless &gt; mint &gt; client &gt; statistics</code> command output. Select the columns (information) displayed from the following options: client-alias, portal-alias, portal-bss, rx-bytes, rx-errors, rx-packets, rx-throughput, t-index, tx-bytes, tx-dropped, tx-packets, tx-throughput. These are recursive parameters and you can select multiple options at a time. <strong>Note:</strong> The columns displayed by default are: Portal, Portal-Radio-MAC, Client, Tx bytes, Rx bytes, TX pkts, Rx pkts, TX (bps), Rx (bps), T-Index (%), and Dropped pkts. <strong>Note:</strong> Where ever available, you can optionally use the <code>&lt;1-64&gt;</code> parameter to set the column width.</td>
</tr>
<tr>
<td>show-wireless-mint-client-stats-rf</td>
<td>Configures the information displayed in the <code>show &gt; wireless &gt; mint &gt; client &gt; statistics &gt; rf</code> command output. Select the columns (information) displayed from the following options: average-retry-number, client-alias, error-rate, noise, portal-alias, portal-bss, q-index, rx-rate, signal, snr, and tx-rate. These are recursive parameters and you can select multiple options at a time. <strong>Note:</strong> The columns displayed by default are: MAC, Signal (dBm), Noise (dBm), SNR (dB), Tx-Rate (Mbps), Rx-rate (Mbps), Retry Avg, Errors (pps), and Q-Index (%). <strong>Note:</strong> Where ever available, you can optionally use the <code>&lt;1-64&gt;</code> parameter to set the column width.</td>
</tr>
</tbody>
</table>

- **neighbor-hostname `<1-64>`**
  Includes the neighbor-hostname, which displays reported neighbor's hostname
  - `<1-64>` – Sets the neighbor-hostname column width from 1 - 64 characters
- **noise**
  Includes the noise column, which displays the noise level in dBm
- **q-index**
  Includes the q-index column, which displays the q-index
- **rx-rate**
  Includes the rx-rate column, which displays rate of receiving
- **signal**
  Includes the signal column, which displays the signal strength in dBm
- **snr**
  Includes the snr column, which displays the signal-to-noise ratio
- **t-index**
  Includes the t-index column, which displays t-index
- **tx-rate**
  Includes the tx-rate column, which displays rate of transmission

- **customize show-wireless-mint-client** (client-alias `<1-64>`, client-bss, portal-alias `<1-64>`, portal-bss, up-time)
- **customize show-wireless-mint-client-stats** (client-alias `<1-64>`, portal-alias `<1-64>`, portal-bss, rx-bytes, rx-errors, rx-packets, rx-throughput, t-index, tx-bytes, tx-dropped, tx-packets, tx-throughput)
- **customize show-wireless-mint-client-stats-rf** (average-retry-number, client-alias `<1-64>`, error-rate, noise, portal-alias `<1-64>`, portal-bss, q-index, rx-rate, signal, snr, tx-rate)
- **Customize show-wireless-mint-portal** *(client-alias <1-64>, client-bss, portal-alias <1-64>, portal-bss, up-time)*

**show-wireless-mint-portal**  
Configures the information displayed in the `show > wireless > mint > portal` command output. Select the columns (information) displayed from the following options: client-alias, client-bss, portal-alias, portal-bss, and up-time. These are recursive parameters and you can select multiple options at a time.  
**Note:** The columns displayed by default are: Client, Client-Radio-MAC, Portal, Portal-Radio-MAC, and Up-Time.  
**Note:** Where ever available, you can optionally use the <1-64> parameter to set the column width.

- **Customize show-wireless-mint-portal-stats** *(client-alias <1-64>, client-bss, portal-alias <1-64>, rx-bytes, rx-errors, rx-packets, rx-throughput, t-index, tx-bytes, tx-dropped, tx-packets, tx-throughput)*

**show-wireless-mint-portal-stats**  
Configures the information displayed in the `show > wireless > mint > portal > statistics` command output. Select the columns (information) displayed from the following options: client-alias, client-bss, portal-alias, rx-bytes, rx-errors, rx-packets, rx-throughput, t-index, tx-bytes, tx-dropped, tx-packets, tx-throughput. These are recursive parameters and you can select multiple options at a time.  
**Note:** The columns displayed by default are: Client, Client-Radio-MAC, Portal, Tx bytes, Rx bytes, TX pkts, RX pkts, TX (bps), Rx (bps), T-Index (%), and Dropped pkts.  
**Note:** Where ever available, you can optionally use the <1-64> parameter to set the column width.

- **Customize show-wireless-mint-portal-stats-rf** *(average-retry-number, client-alias <1-64>, client-bss, error-rate, noise, portal-alias <1-64>, q-index, rx-rate, signal, snr, tx-rate)*

**show-wireless-mint-portal-stats-rf**  
Configures the information displayed in the `show > wireless > mint > portal > statistics > rf` command output. Select the columns (information) displayed from the following options: average-retry-number, client-alias, client-bss, error-rate, noise, portal-alias, q-index, rx-rate, signal, snr, tx-rate. These are recursive parameters and you can select multiple options at a time.  
**Note:** The columns displayed by default are: Client, Client-Radio-MAC, Portal, Signal (dBm), Noise (dBm), SNR (dB), Tx-Rate (Mbps), Rx-rate (Mbps), Retry Avg, Errors (pps), and Q-Index (%).  
**Note:** Where ever available, you can optionally use the <1-64> parameter to set the column width.

- **Customize show-wireless-radio** *(adopt-to, ap-name <1-64>, channel, location <1-64>, num-clients, power, radio-alias <3-67>, radio-id, radio-mac, rf-mode, state)*

**show-wireless-radio**  
Customizes the show wireless radio command output  
**adopt-to**  
Includes the adopt-to column, which displays information about the wireless controller adopting this AP  
**ap-name <1-64>**  
Includes the ap-name column, which displays information about the AP this radio belongs  
• <1-64> – Sets the ap-name column width from 1 - 64 characters  
**channel**  
Includes the channel column, which displays information about the configured and current channel for this radio
| Location <1-64> | Includes the location column, which displays the location of the AP this radio belongs to.  
  • <1-64> – Sets the location column width from 1 - 64 characters |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Num-Clients</td>
<td>Includes the num-clients column, which displays the number of clients associated with this radio</td>
</tr>
<tr>
<td>Power</td>
<td>Includes the power column, which displays the radio’s configured and current transmit power.</td>
</tr>
</tbody>
</table>
| Radio-Alias <3-67> | Includes the radio-alias column, which displays the radio’s alias (combination of AP’s hostname and radio interface number in the “HOSTNAME:RX” format).  
  • <3-67> – Sets the radio-alias column width from 3 - 67 characters |
| Radio-ID        | Includes the radio-id column, which displays the radio’s ID (combination of AP’s MAC address and radio interface number in the “AA-BB-CC-DD-EE-FF:RX” format). |
| Radio-Mac       | Includes the radio-mac column, which displays the radio’s base MAC address. |
| Rf-Mode         | Includes the rf-mode column, which displays the radio’s operating mode. The radio mode can be 2.4 GHz, 5.0 GHz, or sensor. |
| State           | Includes the state column, which displays the radio’s current operational state. |

- `customise show-wireless-radio-stats (radio-alias <3-67>, radio-id, radio-mac, rx-bytes, rx-errors, rx-packets, rx-throughput, tx-bytes, tx-dropped, tx-packets, tx-throughput)`

<table>
<thead>
<tr>
<th>Show-Wireless-Radio-Stats</th>
<th>Customizes the show wireless radio statistics command output</th>
</tr>
</thead>
</table>
| Radio-Alias <3-67>        | Includes the radio-alias column, which displays the radio’s alias (combination of AP’s hostname and radio interface number in the “HOSTNAME:RX” format).  
  • <3-67> – Sets the radio-alias column width from 3 - 67 characters |
| Radio-ID                  | Includes the radio-id column, which displays the radio’s ID (combination of AP’s MAC address and radio interface number in the “AA-BB-CC-DD-EE-FF:RX” format). |
| Radio-Mac                 | Includes the radio-mac column, which displays the radio’s base MAC address. |
| Rx-Bytes                  | Includes the rx-bytes column, which displays the total number of bytes received by the radio. |
| Rx-Errors                 | Includes the rx-error column, which displays the total number of errors received by the radio. |
| Rx-Packets                | Includes the rx-packets column, which displays the total number of packets received by the radio. |
| Rx-Throughput             | Includes the rx-throughput column, which displays the receive throughput at the radio. |
| Tx-Bytes                  | Includes the tx-bytes column, which displays the total number of bytes transmitted by the radio. |
| Tx-Dropped                | Includes the tx-dropped column, which displays the total number of packets dropped by the radio. |
| Tx-Packets                | Includes the tx-packets column, which displays the total number of packets transmitted by the radio. |
| Tx-Throughput             | Includes the tx-throughput column, which displays the transmission throughput at the radio. |
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- customize show-wireless-radio-stats-rf (average-retry-number, error-rate, noise, q-index, radio-alias <3-67>, radio-id, radio-mac, rx-rate, signal, snr, t-index, tx-rate)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show-wireless-radio-stats-rf</td>
<td>Customizes the show wireless radio stats RF command output</td>
</tr>
<tr>
<td>average-retry-number</td>
<td>Includes the average-retry-number column, which displays the average number of retransmissions per packet</td>
</tr>
<tr>
<td>error-rate</td>
<td>Includes the error-rate column, which displays the rate of error for the radio</td>
</tr>
<tr>
<td>noise</td>
<td>Includes the noise column, which displays the noise detected by the radio</td>
</tr>
<tr>
<td>q-index</td>
<td>Includes the q-index column, which displays the RF quality index</td>
</tr>
<tr>
<td>radio-alias &lt;3-67&gt;</td>
<td>Includes the radio-alias column, which displays the radio’s alias (combination of AP’s hostname and radio interface number in the &quot;HOSTNAME:RX&quot; format)</td>
</tr>
<tr>
<td>radio-id</td>
<td>Includes the radio-id column, which displays the radio’s ID (combination of AP’s MAC address and radio interface number in the “AA-BB-CC-DD-EE-FF:RX” format)</td>
</tr>
<tr>
<td>radio-mac</td>
<td>Includes the radio-mac column, which displays the radio’s base MAC address</td>
</tr>
<tr>
<td>rx-rate</td>
<td>Includes the rx-rate column, which displays the receive rate at the particular radio</td>
</tr>
<tr>
<td>signal</td>
<td>Includes the signal column, which displays the signal strength at the particular radio</td>
</tr>
<tr>
<td>snr</td>
<td>Includes the snr column, which displays the signal-to-noise ratio at the particular radio</td>
</tr>
<tr>
<td>t-index</td>
<td>Includes the t-index column, which displays the traffic utilization index at the particular radio</td>
</tr>
<tr>
<td>tx-rate</td>
<td>Includes the tx-rate column, which displays the packet transmission rate at the particular radio</td>
</tr>
</tbody>
</table>

Examples
The following example shows the shows the show > adoption > status command output before customizing the output:

```
show adoption status
DEVICE-NAME | VERSION | CFG-STAT | MSGS | ADOPTED-BY | LAST-ADOPTION | UPTIME
rfs6000-81742D 5.8.4.0-004D configured  No rfs7000-6DCD4B 0 days 05:03:18 0 days 05:06:26
Total number of devices displayed: 1
rfs7000-6DCD4B(config)#
```

```
rfs7000-6DCD4B(config)#customize show-adoption-status adopted-by ap-name config-status last-adoption
```

```
rfs7000-6DCD4B(config)#commit
```
The following example shows the `show adoption status` command output after customizing the output:

```
rfs7000-6DCD4B(config)#show adoption status
------------------------------------------------------------------------
ADOPTED-BY       DEVICE-NAME       CFG-STAT         LAST-ADOPTION
------------------------------------------------------------------------
rfs7000-6DCD4B.. rfs6000-81742D *configured        0 days 05:10:01
------------------------------------------------------------------------
Total number of devices displayed: 1
rfs7000-6DCD4B(config)#
```

Use the `no customize show-adoption-status` command to revert back to the default format.

```
rfs7000-6DCD4B(config)#no customize show-adoption-status
rfs7000-6DCD4B(config)#commit
rfs7000-6DCD4B(config)#
```

```
------------------------------------------------------------------------
DEVICE-NAME    VERSION      CFG-STAT  MSGS  ADOPTED-BY     LAST-ADOPTION     UPTIME
------------------------------------------------------------------------
rfs6000-81742D 5.8.4.0-004D configured No rfs7000-6DCD4B 3 days 22:51:23 3 days 22:54:30
------------------------------------------------------------------------
Total number of devices displayed: 1
rfs7000-6DCD4B(config)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Restores custom CLI settings to default</td>
</tr>
<tr>
<td><code>wireless</code></td>
<td>Displays wireless configuration and other information</td>
</tr>
</tbody>
</table>
4.1.36 database-client-policy

Global Configuration Commands

The following table summarizes the config database client policy commands:

Table 4.12 Database-Client-Policy Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>database-client-policy</td>
<td>Creates a database client policy and enters its configuration mode</td>
<td>page 4-150</td>
</tr>
<tr>
<td>database-client-policy-mode</td>
<td>Summarizes the database client policy mode commands</td>
<td>page 4-152</td>
</tr>
<tr>
<td>mode commands</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.1.36.1 database-client-policy

`database-client-policy` creates a database client policy and enters its configuration mode. The database client policy configures the IP address or hostname of the VX9000 hosting the MongoDB.

The WiNG software supports a split Mongo/NSight environment that provides a more scalable and cost-effective guest management solution, wherein the MongoDB and the NSight server are hosted on separate VX9000 virtual machines (VMs). In such an environment, the database client policy is created and used on the NSight VM to enable the NSight VM identify the VM hosting the MongoDB.

There are two, split Mongo/application deployment scenarios: a non-replica set deployment and a replica set deployment.

The non-replica set deployment consists of two VMs, one hosting the MongoDB and the other hosting the NSight server.

The replica set deployment consists of four VMs deployed across two locations on different subnets - data center 1 and data center 2. Each data center has two VMs, one hosting the MongoDB, while the other hosting the NSight server. Following is an example of the data center 1 & 2 setup:

Data center 1: Mongo-VM1 and NSight-VM1 use 192.168.1.0/24
Data center 2: Mongo-VM2 and NSight-VM2 use 192.168.2.0/24

A third location with one VM hosting a full version of the database is setup to function as the arbiter.

In both these scenarios, the MongoDB VM should be configured with a disk space large enough to support customer’s database requirements. Further, each MongoDB VM must use a database policy enabling the MongoDB daemon.

---

**NOTE:** On the NX95XX model service platforms, the Mongo daemon is enabled by default.

---

Supported in the following platforms:
- Service Platforms — VX9000

**Syntax**

`database-client-policy <DATABASE-CLIENT-POLICY-NAME>`

**Parameters**

- `database-client-policy <DATABASE-CLIENT-POLICY-NAME>`

**Examples**

```
vx9000-34B78B(config)#database-client-policy DBClientPolicy
vx9000-34B78B(config-database-client-policy-DBClientPolicy)#?
```

**Database Client Policy Mode commands:**

- `database-server` Add database server
- `no` Negate a command or set its defaults
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal
To setup a split Mongo/NSight environment,

1. On the VX9000, hosting the Mongo database, use a database policy enabling the Mongo daemon.

2. On the VX9000, hosting the NSight server, create the database client policy, and configure the MongoDB server's IP address or hostname. This is the VX9000 on which the Mongo daemon is enabled.

3. Use this database client policy in the NSight server VM's device context.

---

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an existing database client policy</td>
</tr>
<tr>
<td><code>database-policy</code></td>
<td>Documents database policy configuration commands. A database policy enables the Mongo daemon.</td>
</tr>
<tr>
<td><code>nsight-policy</code></td>
<td>Documents NSight policy configuration commands. The NSight policy is a tool, which when created and applied at the RF Domain level allows the RF Domain manager to send statistics (polled from devices within the RF Domain) to the NOC. The NOC, when enabled as the NSight server, stores this data in a locally or externally hosted Mongo database.</td>
</tr>
<tr>
<td><code>use (profile/device context)</code></td>
<td>Associates a database client policy in the VX9000’s device or profile context</td>
</tr>
</tbody>
</table>
4.1.36.2 database-client-policy-mode commands

- database-client-policy

The following table summarizes database-client-policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>database-server</td>
<td>Configures the MongoDB VM’s identity. Use this command to configure the IP address or hostname of the VM hosting the Mongo database.</td>
<td>page 4-153</td>
</tr>
<tr>
<td>no</td>
<td>Removes the database VM’s IP/hostname configuration</td>
<td>page 4-154</td>
</tr>
</tbody>
</table>
4.1.36.2.1 database-server

*database-client-policy-mode commands*

Configures the IPv4/IPv6 address or hostname of the VM hosting the Mongo database (i.e. the off-box database server)

Supported in the following platforms:
- Service Platforms — VX9000

**Syntax**

database-server [<IP>|<HOSTNAME>|<IPv6>]

**Parameters**

- database-server [<IP>|<HOSTNAME>|<IPv6>]

  | database-server [<IP>|<HOSTNAME>|<IPv6>] | Identifies the MongoDB VM using one of the following options: |
  |------------------------------------------|---------------------------------------------------------------|
  |                                          | • <IP> – Specify the VM's IPv4 address.                        |
  |                                          | • <HOSTNAME> – Specify the VM's hostname.                     |
  |                                          | • <IPv6> – Specify the VM's IPv6 address.                      |

**Examples**

vx9000-34B78B(config-database-client-policy-DBClientPolicy)#database-server 192.168.13.10

vx9000-34B78B(config-database-client-policy-DBClientPolicy)#show context
database-client-policy DBClientPolicy
database-server 192.168.13.10
vx9000-34B78B(config-database-client-policy-DBClientPolicy)#

**Related Commands**

`no` Removes the database server's (the VM hosting the database) IP/hostname configuration
4.1.36.2.2 no

- **database-client-policy-mode commands**
  Removal of the database VM's IP/hostname configuration

**Supported in the following platforms:**
- Service Platforms — NX9000, NX9500, NX9510, VX9000

**Syntax**

```
no database-server
```

**Parameters**

- no database-server

<table>
<thead>
<tr>
<th>no database-server</th>
<th>Removes the MongoDB VM's IPv4/IPv6 address or hostname associated with this database client policy</th>
</tr>
</thead>
</table>

**Examples**

```bash
vx9000-34B78B(config-database-client-policy-DBClientPolicy)#show context
database-client-policy DBClientPolicy
database-server 192.168.13.10
vx9000-34B78B(config-database-client-policy-DBClientPolicy)#

vx9000-34B78B(config-database-client-policy-DBClientPolicy)#no database-server

vx9000-34B78B(config-database-client-policy-DBClientPolicy)#show context
database-client-policy DBClientPolicy
vx9000-34B78B(config-database-client-policy-DBClientPolicy)#
```
### 4.1.37 database-policy

*Global Configuration Commands*

The following table summarizes the config database policy commands:

**Table 4.14 Database-Policy Config Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>database-policy</td>
<td>Creates a database policy and enters its configuration mode</td>
<td>page 4-156</td>
</tr>
<tr>
<td>database-policy-mode</td>
<td>Lists database policy configuration mode commands</td>
<td>page 4-158</td>
</tr>
<tr>
<td>database-policy-mode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.1.37.1 database-policy

database-policy

Creates a database policy and enters its configuration mode. A database policy enables the deployment of a replica set from a single MongoDB instance. A replica set in MongoDB is a group of devices (replica-set members) running the mongod instances that maintain the same data set. Replica sets provide redundancy and high availability and are the basis for all production deployments.

A replica set usually consists of: an arbiter, a primary member, and one or more secondary members. The primary member and the secondary member(s) maintain replicas of the data set. All real-time, client-write operations are accepted by the primary member only and are recorded in the primary member’s operations log (oplog). The secondary member(s) asynchronously replicate the primary member’s oplog in order to maintain a data set identical to that of the primary member. In case of the primary member’s unavailability, one of the secondary member is elected as the primary member. The arbiter, on the other hand, does not maintain a data set and is added to the replica set to facilitate the election of the fall-back primary member. It provides that one extra vote required in the election of the primary member.

For the fall-back primary-member election to succeed, at least one member and the arbiter should up and running and mutually reachable. If, for example, in a three-member replica set the primary goes down but the secondary and the arbiter are up and mutually reachable, the secondary member is designated as the primary member and begins to accept write operations. But, if the arbiter is down, or if the arbiter and the secondary are unable to communicate with each other, the secondary member’s status remains unchanged.

Before deploying a replica set, ensure that each of the device identified to be a replica-set member:

- has MongoDB installed, and
- is able to communicate with every other member in the set.

Having installed MongoDB and established connectivity,

- Create a database policy (with identical replica-set configuration) on each of the member device, and
- Use the database policy in the member device’s configuration mode.

These member devices elect a primary member, which begins accepting client-write operations. Remaining devices in the replica-set, with the exception of the arbiter, are designated as secondary members.

**NOTE:** In a replica-set, the primary and secondary members can be deployed only on an NX95XX series service platform or a VX9000. However, the arbiter can be an NX5500, NX75XX, and NX9XXX series service platforms. For more information on using the database policy in the NX95XX device, see use.

Supported in the following platforms:

- Service Platforms — NX9000, NX9500, NX9510, VX9000

**Syntax**

database-policy <DATABASE-POLICY-NAME>

**Parameters**

- database-policy <DATABASE-POLICY-NAME>

| database-policy <DATABASE-POLICY-NAME> | Specify the database policy name. If the policy does not exist, it is created. |
**Examples**

nx9500-6C8809(config-database-policy-test)#?

Database Policy Mode commands:

- no          Negate a command or set its defaults
- replica-set Replica Set
- shutdown    Disable database server

- clrscr      Clears the display screen
- commit      Commit all changes made in this session
- do          Run commands from Exec mode
- end         End current mode and change to EXEC mode
- exit        End current mode and down to previous mode
- help        Description of the interactive help system
- revert      Revert changes
- service     Service Commands
- show        Show running system information
- write       Write running configuration to memory or terminal

nx9500-6C8809(config-database-policy-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes an existing database policy</td>
</tr>
</tbody>
</table>
4.1.37.2 database-policy-mode commands

The following table summarizes database-policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>replica-set</td>
<td>Adds a member (hosting mongod instance) to a MongoDB replica set</td>
<td>page 4-159</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down the MongoDB database server</td>
<td>page 4-160</td>
</tr>
<tr>
<td>no</td>
<td>Removes a member from the MongoDB replica set</td>
<td>page 4-161</td>
</tr>
</tbody>
</table>
4.1.37.2.1 replica-set

database-policy-mode commands

Adds a member (hosting mongod instance) to a MongoDB replica set. A replica set in MongoDB is a group of devices running the mongod instances that maintain the same data set. Replica sets provide redundancy and high availability, and are the basis for all production deployments.

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600, VX9000, NX7500, NX5500

Syntax

replica-set member [IP|FQDN] {arbiter|priority <0-255>}

Parameters
- replica-set member [IP|FQDN] {arbiter|priority <0-255>}

Examples

nx9500-6C8809(config-database-policy-test)#replica-set member 192.168.13.14 arbiter
nx9500-6C8809(config-database-policy-test)#replica-set member 192.168.13.16 priority 1
nx9500-6C8809(config-database-policy-test)#replica-set member 192.168.13.12 priority 2
nx9500-6C8809(config-database-policy-test)#show context database-policy test
  replica-set member 192.168.13.12 priority 2
  replica-set member 192.168.13.14 arbiter
  replica-set member 192.168.13.16 priority 1
nx9500-6C8809(config-database-policy-test)#

Related Commands

no

Removes a member from the MongoDB replica set
4.1.37.2.2 shutdown

Shuts down the MongoDB database server (i.e. stops the Mongo daemon). The factory default is set as `no shutdown`.

**Syntax**

```
shutdown
```

**Parameters**

None

**Examples**

```
nx9500-6C8809(config-database-policy-test)#shutdown

nx9500-6C8809(config-database-policy-test)#show context database-policy test
  shutdown

nx9500-6C8809(config-database-policy-test)#
```

**Related Commands**

`no` Enables the MongoDB database server (starts the Mongo daemon)
4.1.37.2.3  no

    database-policy-mode commands

Removes or reverts to default values the MongoDB database policy settings

Supported in the following platforms:

- Service Platforms — NX9000, NX9500, NX9510, NX9600, VX9000, NX7500, NX5500

Syntax

no [replica-set|shutdown]

no replica-set member [<IP>|<FQDN>]

no shutdown

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes a member from the MongoDB replica set, or brings up a MongoDB server that has been shut down |

Examples

The following example shows a three-member replica set:

nx9500-6C8809(config-database-policy-test)#show context
database-policy test
    replica-set member 192.168.13.12 priority 2
    replica-set member 192.168.13.14 arbiter
    replica-set member 192.168.13.16 priority 1

nx9500-6C8809(config-database-policy-test)#

In the following example the arbiter is being removed, leaving the replica set with only two members:

nx9500-6C8809(config-database-policy-test)#no replica-set member 192.168.13.14

nx9500-6C8809(config-database-policy-test)#show context
database-policy test
    replica-set member 192.168.13.12 priority 2
    replica-set member 192.168.13.16 priority 1

nx9500-6C8809(config-database-policy-test)#

Since a replica set must have at least three members, another member must be added to this replica set. This member may or may not be an arbiter.

nx9500-6C8809(config-database-policy-test)#replica-set member 192.168.13.8 priority 3

nx9500-6C8809(config-database-policy-test)#show context
database-policy test
    replica-set member 192.168.13.12 priority 2
    replica-set member 192.168.13.16 priority 1
    replica-set member 192.168.13.8 priority 3

nx9500-6C8809(config-database-policy-test)#
4.1.38 device

Global Configuration Commands

Enables simultaneous configuration of multiple devices

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

device {containing|filter}

device {containing <STRING>} {filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|ex3524|ex3548|rfs4000|rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600|t5|vx9000]}

device {filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|ex3524|ex3548|rfs4000|rfs6000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600|t5|vx9000]}

Parameters

- device {containing <STRING>} {filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|ex3524|ex3548|rfs4000|rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600|t5|vx9000]}

device

Enters a device’s configuration mode. Use this command to simultaneously configure devices having similar configuration.

containing

Optional. Configures the string to search for in the device’s hostname. All devices having hostnames containing the string specified here are filtered, and can be configured simultaneously.

- <STRING> – Specify the string to search for in the device’s hostname.

filter type

Optional. Filters out a specific device type. After specifying the hostname string, select the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, EX3524, EX3548, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, t5, and VX9000 (V-WLC).

Note: The t5 option is applicable only on the RFS7000, NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, and NX9600 platforms.

Note: The VX9000 option is applicable only to the NX9000, NX9500, NX9510, and NX9600 platforms.

- device {filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|ex3524|ex3548|rfs4000|rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600|t5|vx9000]}

device

Configures a basic device profile

filter type

Optional. Filters out a specific device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, EX3524, EX3548, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9600, t5, and VX9000 (V-WLC).

Contd..
**Examples**

```
rfs7000-6DCD4B(config)#device filter type ap81xx
rfs7000-6DCD4B(config-device-{'type': 'ap81xx'})#
```

**Related Commands**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes multiple devices from the network</td>
</tr>
</tbody>
</table>

**Note:** The t5 option is applicable only on the RFS7000, NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, and NX9600 platforms.

**Note:** The VX9000 option is applicable only to the NX9000, NX9500, NX9510, and NX9600 platforms.
### 4.1.39 `device-categorization`

*Global Configuration Commands*

Categorizes devices as sanctioned or neighboring. Categorization of devices enables quick identification and blocking of unsanctioned devices in the network.

The following table summarizes the device categorization mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>device-categorization</code></td>
<td>Creates a device categorization list and enters its configuration mode</td>
<td>page 4-165</td>
</tr>
<tr>
<td><code>device-categorization-mode</code></td>
<td>Summarizes device categorization list configuration mode commands</td>
<td>page 4-166</td>
</tr>
</tbody>
</table>
4.1.39.1 **device-categorization**

`device-categorization`

Configures a device categorization list

Proper classification and categorization of devices (access points, clients, etc.) helps suppress unnecessary unauthorized access point alarms, allowing network administrators to focus on alarms on devices actually behaving in a suspicious manner. An intruder with a device erroneously authorized could potentially perform activities that harm your organization.

Authorized access points and clients are generally known to you and conform with your organization’s security policies. Unauthorized devices are those detected as interoperating within the network, but are not approved. These devices should be filtered to avoid jeopardizing the data within a managed network. Use this command to apply the neighboring and sanctioned (approved) filters on peer devices operating within a wireless controller or access point’s radio coverage area. Detected client MAC addresses can also be filtered based on their classification.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9600

**Syntax**

```
device-categorization <DEVICE-CATEGORIZATION-LIST-NAME>
```

**Parameters**

- `device-categorization <DEVICE-CATEGORIZATION-LIST-NAME>`

**Examples**

```
rfs7000-37FABE(config)#device-categorization rfs7000
rfs7000-37FABE(config-device-categorization-rfs7000)#?
```

Device Category Mode commands:

- `mark-device` Add a device
- `no` Negate a command or set its defaults
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
rfs7000-37FABE(config-device-categorization-rfs7000)#
```

**Related Commands**

- `no` Removes an existing device categorization list
## device-categorization-mode commands

The following table summarizes device categorization configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>mark-device</td>
<td>Adds a device to the device categorization list</td>
<td>page 4-167</td>
</tr>
<tr>
<td>no</td>
<td>Removes a device from the device categorization list</td>
<td>page 4-168</td>
</tr>
</tbody>
</table>
4.1.39.2.1 mark-device

Adds a device to the device categorization list as sanctioned or neighboring. Devices are further classified as AP or client.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
mark-device <1-1000> [sanctioned|neighboring] [ap|client]
mark-device <1-1000> [sanctioned|neighboring] ap {mac <MAC>|ssid <SSID> {mac <MAC>}}
mark-device <1-1000> [sanctioned|neighboring] client {mac <MAC>}

Parameters
- mark-device <1-1000> [sanctioned|neighboring] ap {mac <MAC>|ssid <SSID> {mac <MAC>}}
- mark-device <1-1000> [sanctioned|neighboring] client {mac <MAC>}

Examples
rfs7000-37FABE(config-device-categorization-rfs7000)#mark-device 1 sanctioned ap mac 11-22-33-44-55-66
rfs7000-37FABE(config-device-categorization-rfs7000)#show context
device-categorization rfs7000
mark-device 1 sanctioned ap mac 11-22-33-44-55-66
rfs7000-37FABE(config-device-categorization-rfs7000)#

Related Commands
- no
  Removes an entry from the device categorization list
4.1.39.2.2 no

Removes a device from the device categorization list

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no mark-device <1-1000> [neighboring|sanctioned] [ap|client] {mac <MAC>}
no mark-device <1-1000> [sanctioned|neighboring] client {mac <MAC>}
no mark-device <1-1000> [sanctioned|neighboring] ap {mac <MAC>|ssid <SSID> {mac <MAC>}}

Parameters
- no <PARAMETERS>

Examples

The following example shows the device categorization list 'rfs7000' settings before the 'no' command is executed:

```
rfs7000-37FABE(config-device-categorization-rfs7000)#show context
device-categorization rfs7000
  mark-device 1 sanctioned ap mac 11-22-33-44-55-66
rfs7000-37FABE(config-device-categorization-rfs7000)#
```

The following example shows the device categorization list 'rfs7000' settings after the 'no' command is executed:

```
rfs7000-37FABE(config-device-categorization-rfs7000)#no mark-device 1 sanctioned ap mac 11-22-33-44-55-66
rfs7000-37FABE(config-device-categorization-rfs7000)#
```

Related Commands

- mark-device
  Adds a device to a list of sanctioned or neighboring devices
4.1.40 dhcp-server-policy

Configures DHCPv4 server policy parameters, such as class, address range, and options. A new policy is created if it does not exist.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dhcp-server-policy <DHCP-SERVER-POLICY-NAME>

Parameters

- dhcp-server-policy <DHCP-SERVER-POLICY-NAME>

Examples

rfs7000-37FABE(config)#dhcp-server-policy test
rfs7000-37FABE(config-dhcp-policy-test)#?

DHCP policy Mode commands:

- bootp: BOOTP specific configuration
- dhcp-class: Configure DHCP class (for address allocation using DHCP user-class options)
- dhcp-pool: Configure DHCP server address pool
- dhcp-server: Activating dhcp server based on criteria
- no: Negate a command or set its defaults
- option: Define DHCP server option
- ping: Specify ping parameters used by DHCP Server

rfs7000-37FABE(config-dhcp-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes an existing DHCP server policy</td>
</tr>
</tbody>
</table>

NOTE: For more information on DHCP policy, see Chapter 12, DHCP-SERVER-POLICY.
Global Configuration Commands

4.1.41 dhcpv6-server-policy

Creates a DHCPv6 server policy and enters its configuration mode

DHCPv6 is a networking protocol for configuring IPv6 hosts with IP addresses, IP prefixes, or other configuration attributes required on an IPv6 network.

DHCPv6 servers pass IPv6 network addresses to IPv6 clients. The DHCPv6 address assignment feature manages non-duplicate addresses in the correct prefix based on the network where the host is connected. Assigned addresses can be from one or multiple pools. Additional options, such as the default domain and DNS name-server address, can be passed back to the client. Address pools can be assigned for use on a specific interface or on multiple interfaces, or the server can automatically find the appropriate pool.

When configured and applied to a device, the DHCPv6 server policy enables the device to function as a stateless DHCPv6 server.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dhcpv6-server-policy <DHCPv6-SERVER-POLICY-NAME>

Parameters
- dhcpv6-server-policy <DHCPv6-SERVER-POLICY-NAME>

Examples

rfs7000-6DCD4B(config)#dhcpv6-server-policy test
rfs7000-6DCD4B(config-dhcpv6-server-policy-test)#?

DHCPv6 server policy Mode commands:
- dhcpv6-pool Configure DHCPv6 server address pool
- no Negate a command or set its defaults
- option Define DHCPv6 server option
- restrict-vendor-options Restrict vendor specific options to be sent in server reply
- server-preference Server preference value sent in the reply, by the server to client
- clrscr Clears the display screen
- commit Commit all changes made in this session
- do Run commands from Exec mode
- end End current mode and change to EXEC mode
- exit End current mode and down to previous mode
- help Description of the interactive help system
- revert Revert changes
- service Service Commands
- show Show running system information
- write Write running configuration to memory or terminal

Related Commands

no Removes an existing DHCPv6 server policy
NOTE: For more information on DHCP policy, see Chapter 12, DHCP-SERVER-POLICY.
4.1.42 dns-whitelist

- Global Configuration Commands

Configures a DNS whitelist. A DNS whitelist is a list of domains allowed access to the network.

The following table lists DNS Whitelist configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dns-whitelist</td>
<td>Creates a DNS whitelist and enters its configuration mode</td>
<td>page 4-173</td>
</tr>
<tr>
<td>dns-whitelist-mode</td>
<td>Summarizes DNS whitelist configuration mode commands</td>
<td>page 4-174</td>
</tr>
</tbody>
</table>

Table 4.18 DNS-Whitelist Config Commands
4.1.42.1 dns-whitelist

```
4.1.42.1 dns-whitelist

Configures a DNS whitelist. A DNS whitelist is a list of allowed DNS destination IP addresses pre-approved to access a controller, service platform, or access point managed captive portal.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dns-whitelist <DNS-WHITELIST-NAME>

Parameters
- dns-whitelist <DNS-WHITELIST-NAME>

Examples

rfs7000-37FABE(config)#dns-whitelist test
rfs7000-37FABE(config-dns-whitelist-test)#?

DNS Whitelist Mode commands:
no Negate a command or set its defaults
permit Match a host
clrscr Clears the display screen
commit Commit all changes made in this session
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

rfs7000-37FABE(config-dns-whitelist-test)#

Related Commands

no Removes an existing DNS Whitelist
```
4.1.42.2 dns-whitelist-mode commands

The following table summarizes DNS Whitelist configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>permit</td>
<td>Permits a host, existing on a DNS whitelist, access to the network or captive portal</td>
<td>page 4-175</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts to default</td>
<td>page 4-176</td>
</tr>
</tbody>
</table>
4.1.42.2.1 permit

A whitelist is a list of host names and IP addresses permitted access to the network or captive portal. This command adds a host or destination IP address to the DNS whitelist.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
permit <IPv4/IPv6/HOSTNAME> {suffix}

Parameters
- permit <IPv4/IPv6/HOSTNAME> {suffix}

<table>
<thead>
<tr>
<th>&lt;IPv4/IPv6/HOSTNAME&gt;</th>
<th>Adds a device to the DNS whitelist</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;IPv4/IPv6/HOSTNAME&gt; – Provide a hostname or numerical IPv4 or IPv6 address for each destination IP address or host included in the whitelist.</td>
</tr>
</tbody>
</table>

Note: A maximum of 256 entries can be made.

suffix
- suffix

Optional. Matches any hostname or domain name including the specified name as suffix

Examples
rfs7000-37FABE(config-dns-whitelist-test)#permit example_company.com suffix

rfs7000-37FABE(config-dns-whitelist-test)#show context dns-whitelist test
permit example_company.com suffix
rfs7000-37FABE(config-dns-whitelist-test)#

Related Commands
- **no** | Removes a DNS whitelist entry |
4.1.42.2.2 no

**dns-whitelist-mode commands**

Removes a specified host or IP address from the DNS whitelist, and prevents it from accessing network resources

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

no permit <IPv4/IPv6/HOSTNAME>

**Parameters**
- no permit <IPv4/IPv6/HOSTNAME>

<table>
<thead>
<tr>
<th>&lt;IPv4/IPv6/HOSTNAME&gt;</th>
<th>Removes a device from the DNS whitelist (identifies the device by its IP address or hostname)</th>
</tr>
</thead>
</table>

**Examples**

rfs7000-37FABE(config-dns-whitelist-test)#show context
dns-whitelist test
permit example_company.com suffix
rfs7000-37FABE(config-dns-whitelist-test)#

rfs7000-37FABE(config-dns-whitelist-test)#no permit example_company.com

rfs7000-37FABE(config-dns-whitelist-test)#show context
dns-whitelist test
rfs7000-37FABE(config-dns-whitelist-test)#

**Related Commands**

| permit | Adds a device to the DNS whitelist |
4.1.43 end

Global Configuration Commands

Ends and exits the current mode and moves to the PRIV EXEC mode.
The prompt changes to the PRIV EXEC mode.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
end

Parameters
None

Examples
rfs7000-37FABE(config)#end
rfs7000-37FABE#
4.1.44 **event-system-policy**

*Global Configuration Commands*

The following table lists event system configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>event-system-policy</code></td>
<td>Creates an event system policy and enters its configuration mode</td>
<td>page 4-179</td>
</tr>
<tr>
<td><code>event-system-policy-mode commands</code></td>
<td>Summarizes event system policy configuration mode commands</td>
<td>page 4-180</td>
</tr>
</tbody>
</table>
4.1.44.1 event-system-policy

- event-system-policy

Configures a system wide events handling policy

Event system policies enable administrators to create notification mechanisms using one, some, or all of the SNMP, syslog, controller forwarding, or email notification options available to the controller or service platform. Each listed event can have customized notification settings defined and saved as part of an event policy. Thus, policies can be configured and administrated in respect to specific sets of client association, authentication or encryption, and performance events. Once policies are defined, they can be mapped to device profiles strategically as the likelihood of an event applies to particular devices.

To view an existing event system policy configuration details, use the `show > event-system-policy` command.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`event-system-policy <EVENT-SYSTEM-POLICY-NAME>`

Parameters

- `event-system-policy <EVENT-SYSTEM-POLICY-NAME>`

<table>
<thead>
<tr>
<th>&lt;EVENT-SYSTEM-POLICY-NAME&gt;</th>
<th>Specify the event system policy name. If the policy does not exist, it is created.</th>
</tr>
</thead>
</table>

Examples

```
rfs7000-37FABE(config)#event-system-policy event-testpolicy
rfs7000-37FABE(config-event-system-policy-event-testpolicy)#?
```

Event System Policy Mode commands:

- `event` Configure an event
- `no` Negate a command or set its defaults
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
rfs7000-37FABE(config-event-system-policy-event-testpolicy)#
```

Related Commands

- `no` Removes an event system policy
4.144.2 event-system-policy-mode commands

The following table summarizes event system policy configuration mode commands:

Table 4.21 Event-System-Policy Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>event</td>
<td>Configures an event</td>
<td>page 4-181</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts to default</td>
<td>page 4-192</td>
</tr>
</tbody>
</table>
4.1.44.2.1 event

event-system-policy-mode commands

Configures an event and sets the action performed when the event happens

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

event <EVENT-TYPE> <EVENT-NAME> (email,forward-to-switch,snmp,syslog) [default|on|off]

The event types are:

```
rfs7000-37FABE(config-event-system-policy-testpolicy)#event ?
aaa             AAA/Radius module
adapt           Adaptsivity Module
adopt-service   Adoption Service
adv-wips        Adv-wips module
ap              Access Point module
captive-portal Captive Portal
cdp             Cisco Discovery Protocol
certmgr         Certificate Manager (Not valid for NCAP/MCN)
cfgd            Cfgd module
cluster         Cluster module
crm             Critical Resource Monitoring
database        Database Services
device          Device module
dhcpsvr         DHCP Configuration Daemon
diag            Diag module
dot11           802.11 management module
dot1x           802.1X Authentication
fwu             Firmware update module
isdn            Isdn module
l2gre           Layer 2 GRE Tunnel
l2tpv3          Layer 2 Tunneling Protocol Version 3
licmgr          License module
lldp            Link Layer Discovery Protocol
mgmt            Management Services
nsm             Network Services Module
pm              Process-monitor module
radconf         Radius Configuration Daemon
rasst           Roaming-Assist module
radio           Radio module
smtpnot         Smtpnot module
system          System module
test            Test module
vrrp            Virtual Router Redundancy Protocol
webf            Webf module
wips            Wireless IPS module
```

rfs7000-37FABE(config-event-system-policy-testpolicy)#

NOTE: The parameter values for <EVENT-TYPE> and <EVENT-NAME> are summarized in the table under the Parameters section.
## Parameters

- **event** `<EVENT-TYPE> <EVENT-NAME>` (email, forward-to-switch, snmp, syslog) [default|on|off]

<table>
<thead>
<tr>
<th><code>&lt;event-type&gt;</code></th>
<th><code>&lt;event-name&gt;</code></th>
</tr>
</thead>
</table>
| **aaa**        | Enables and configures the logging of authentication, authorization, and accounting related event messages  
  - radius-discon-msg – RADIUS disconnection message  
  - radius-session-expired – RADIUS session expired message  
  - radius-session-not-started – RADIUS session not started message  
  - radius-vlan-update – RADIUS VLAN update message |
| **adapt**      | Enables and configures the logging of adaptivity module related events  
  - adaptivity-change – Event adaptivity change message  
  - adaptivity-rehome – Event adaptivity rehome message |
| **adopt-services** | Enables and configures the logging of adopted services related events |
| **adv-wips**   | Enables and configures the logging of advanced WIPS related events |
| **ap**         | Enables and configures the logging of AP related event messages  
  - adopted – Event AP adopted message  
  - adopted-to-controller – Event AP adopted to wireless controller message  
  - ap-adopted – Event access port adopted message  
  - ap-autoup-done – Event AP autoup done message  
  - ap-autoup-fail – Event AP autoup fail message  
  - ap-autoup-needed – Event AP autoup needed message  
  - ap-autoup-no-need – Event AP autoup not needed message  
  - ap-autoup-reboot – Event AP autoup reboot message  
  - ap-autoup-timeout – Event AP autoup timeout message  
  - ap-autoup-ver – Event AP autoup version message  
  - ap-reset-detected – Event access port reset detected message  
  - ap-reset-request – Event access port user requested reset message  
  - ap-timeout – Event access port timed out message  
  - ap-unadopted – Event access port unadopted message  
  - image-parse-failure – Event image parse failure message  
  - legacy-auto-update – Event legacy auto update message  
  - no-image-file – Event no image file message  
  - offline – Event AP detected as offline  
  - online – Event offline AP detected as online  
  - reset – Event reset message  
  - sw-conn-lost – Event software connection lost message  
  - unadopted – Event unadopted message |
| **captive-portal** | Enables and configures the logging of captive portal (hotspot) related event messages  
  - allow-access – Event client allowed access message  
  - auth-failed – Event authentication failed message  
  - auth-success – Event authentication success message  
  - client-disconnect – Event client disconnected message |

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<td>• duplex-mismatch – Event duplex mismatch detected between CDP neighbors</td>
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<td>Enables and configures the logging of certificate manager related event messages (Not applicable to AP6511 and AP6521)</td>
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<td>• ca-cert-actions-failure – Event CA certificate actions failure message</td>
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<td>• crl-actions-failure – Event Certificate Revocation List (CRL) actions failure message</td>
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<td>• delete-trustpoint-action – Event delete trustpoint action message</td>
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<td>• state-change-active – Event cluster state change to active</td>
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<td>• state-retain-active – Event cluster state retained as active</td>
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| database     | Enables and configures the logging of error conditions in the NSIght database  
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|              | • database-low-disk-space – Event database low disk space restarted message  
|              | • Database-new-state – Event database state change message                  
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|              | • database-set-name-mismatch – Event replica-set not enabled on host message  
|              | • database-storage-mismatch – Event MongoDB database mismatch message. All database files must be removed.  
|              | • operation-complete – Event MongoDB database operation completed successfully message  
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|              | • dhcp-start – Event DHCP server started message                            
|              | • dhcpsvr-stop – Event DHCP server stopped message                          
|              | • relay-iface-no-ip – Event no IP address on DHCP relay interface message    
|              | • relay-no-iface – Event no interface for DHCP relay message                 
|              | • relay-start – Event relay agent started                                   
|              | • relay-stop – Event DHCP relay agent stopped                               |
| diag         | Enables and configures the logging of diagnostics module related event messages  
|              | • autogen-tech-sprt – Event autogen technical support message                
|              | • buf-usage – Event buffer usage message                                     
|              | • cpu-load – Event CPU load message                                          
|              | • cpu-usage-too-high – Event CPU usage high message                          
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|              | • disk-usage – Event disk usage message                                      
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|              | • free-flash-disk – Event free flash disk message                            
|              | • free-flash-inodes – Event free flash inodes message                        
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|              | • free-ram – Event free ram message                                          
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<td>poe-state-change – Event PoE state change message</td>
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<td>raid-degraded   – Event Redundant Array of Independent Disks (RAID) degraded message</td>
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<td>under-voltage   – Event under voltage message</td>
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<td>wd-reset-sys    – Event wd reset system message</td>
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<td></td>
<td>wd-state-change – Event wd state change message</td>
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<td>eap-preauth-client-timeout – Event EAP pre authentication client timeout message</td>
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<td>eap-server-timeout – Event EAP server timeout message</td>
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<td>• neighbor-denied-assoc – Event neighbor denied association message</td>
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<td>• tkip-mic-fail-report – Event TKIP MIC failure report</td>
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<td>• tkip-mic-failure – Event TKIP MIC check failed message</td>
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<td>• wlan-time-access-disable – Event WLAN disabled by time-based-access message</td>
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<td>• l2gre-tunnel-failover – Event L2GRE tunnel failover message</td>
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<td>• log-https-wait – Event waiting for Web server to start</td>
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<td>• log-key-deleted – Event RSA key associated with SSH is deleted</td>
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<td>• meshpoint-up – Event meshpoint up message</td>
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<tr>
<td>nsm</td>
<td>Enables and configures the logging of <em>Network Service Module</em> (NSM) related event messages</td>
</tr>
<tr>
<td></td>
<td>• dhcpc-err – Event DHCP certification error message</td>
</tr>
<tr>
<td></td>
<td>• dhcpdefrt – Event DHCP defrt message</td>
</tr>
<tr>
<td></td>
<td>• dhcpip – Event DHCP IP message</td>
</tr>
<tr>
<td></td>
<td>• dhcpipchg – Event DHCP IP change message</td>
</tr>
<tr>
<td></td>
<td>• dhcppipnaddr – Event DHCP IP overlaps static IP address message</td>
</tr>
<tr>
<td></td>
<td>• dhcpplesxp – Event DHCP lease expiry message</td>
</tr>
<tr>
<td></td>
<td>• dhcppnack – Event DHCP server returned DHCP NAK response</td>
</tr>
<tr>
<td></td>
<td>• dhcpnodefrt – Event interface no default route message</td>
</tr>
<tr>
<td></td>
<td>• if-failback – Event interface failback message</td>
</tr>
<tr>
<td></td>
<td>• if-failover – EVENT interface failover message</td>
</tr>
<tr>
<td></td>
<td>• ifdown – Event interface down message</td>
</tr>
<tr>
<td></td>
<td>• ifup – Event interface up message</td>
</tr>
<tr>
<td></td>
<td>• nsm-ntp – Event translate host name message</td>
</tr>
<tr>
<td></td>
<td>• ntp-start – Event NTP server start message</td>
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<tr>
<td></td>
<td>• ntp-stop – Event NTP server stop message</td>
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<tr>
<td>pm</td>
<td>Enables and configures the logging of process monitor module related event messages</td>
</tr>
<tr>
<td></td>
<td>• procid – Event proc ID message</td>
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<td>• procmmaxrstrt – Event proc max restart message</td>
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<tr>
<td></td>
<td>• procnoresp – Event proc no response message</td>
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<td></td>
<td>• procrstrt – Event proc restart message</td>
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<td></td>
<td>• procrstart – Event proc start message</td>
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<td></td>
<td>• procsystop – Event proc stop message</td>
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<td></td>
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<td></td>
<td>• startupcomplete – Event startup complete message</td>
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<td>radconf</td>
<td>Enables and configures the logging of RADIUS configuration daemon related event messages</td>
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<td></td>
<td>• could-not-stop-radius – Event could not stop RADIUS server message</td>
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<td>• radiusdstart – Event RADIUS server started message</td>
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<td></td>
<td>• radiusdstop – Event RADIUS server stopped message</td>
</tr>
<tr>
<td><strong>&lt;event-type&gt;</strong></td>
<td><strong>&lt;event-name&gt;</strong></td>
</tr>
<tr>
<td>------------------</td>
<td>------------------</td>
</tr>
<tr>
<td><strong>radio</strong></td>
<td>Enables and configures the logging of radio module related event messages</td>
</tr>
<tr>
<td></td>
<td>• acs-scan-complete – Event ACS scan completed</td>
</tr>
<tr>
<td></td>
<td>• acs-scan-started – Event ACS scan started</td>
</tr>
<tr>
<td></td>
<td>• channel-country-mismatch – Event channel and country of operation mismatch message</td>
</tr>
<tr>
<td></td>
<td>• radar-det-info – Detected radar info message</td>
</tr>
<tr>
<td></td>
<td>• radar-detected – Event radar detected message</td>
</tr>
<tr>
<td></td>
<td>• radar-scan-completed – Event radar scan completed message</td>
</tr>
<tr>
<td></td>
<td>• radar-scan-started – Event radar scan started message</td>
</tr>
<tr>
<td></td>
<td>• radio-antenna-error – Event invalid antenna type on this radio message</td>
</tr>
<tr>
<td></td>
<td>• radio-antenna-setting – Event antenna type setting on this radio message</td>
</tr>
<tr>
<td></td>
<td>• radio-state-change – Event radio state change message</td>
</tr>
<tr>
<td></td>
<td>• resume-home-channel – Event resume home channel message</td>
</tr>
<tr>
<td><strong>rasst</strong></td>
<td>Enables and configures the logging of roaming assist module related event message</td>
</tr>
<tr>
<td><strong>smrt</strong></td>
<td>Enables and configures the logging of SMART RF module related event messages</td>
</tr>
<tr>
<td></td>
<td>• calibration-done – Event calibration done message</td>
</tr>
<tr>
<td></td>
<td>• calibration-started – Event calibration started message</td>
</tr>
<tr>
<td></td>
<td>• channel-change – Event channel change message</td>
</tr>
<tr>
<td></td>
<td>• config-cleared – Configuration cleared event message</td>
</tr>
<tr>
<td></td>
<td>• cov-hole-recovery – Event coverage hole recovery message</td>
</tr>
<tr>
<td></td>
<td>• cov-hole-recovery-done – Event coverage hole recovery done message</td>
</tr>
<tr>
<td></td>
<td>• interference-recovery – Event interference recovery message</td>
</tr>
<tr>
<td></td>
<td>• neighbor-recovery – Event neighbor recovery message</td>
</tr>
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<td></td>
<td>• power-adjustment – Event power adjustment message</td>
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<td></td>
<td>• root-recovery – Event meshpoint root recovery message</td>
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<td><strong>smtpnot</strong></td>
<td>Enables and configures the logging of SMTP module related event messages</td>
</tr>
<tr>
<td></td>
<td>• cfg – Event cfg message</td>
</tr>
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<td></td>
<td>• cfginc – Event cfg inc message</td>
</tr>
<tr>
<td></td>
<td>• net – Event net message</td>
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<tr>
<td></td>
<td>• proto – Event proto message</td>
</tr>
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<td></td>
<td>• smtpauth – Event SMTP authentication message</td>
</tr>
<tr>
<td></td>
<td>• smtperr – Event SMTP error message</td>
</tr>
<tr>
<td></td>
<td>• smtpinfo – Event SMTP information message</td>
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<tr>
<td><strong>system</strong></td>
<td>Enables and configures the logging of system module related event messages</td>
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<td></td>
<td>• clock-reset – Event clock reset message</td>
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<td>• cold-start – Event cold start message</td>
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<td></td>
<td>• config-commit – Event configuration commit message</td>
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<td></td>
<td>• config-revision – Event config-revision done message</td>
</tr>
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<td></td>
<td>• devup-rfd-fail – Event device-upgrade failed on rf-domain manager managed devices message</td>
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<td></td>
<td>• guest-user-exp – Event guest user purging message</td>
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<tr>
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<td>• http-err – Event Web server did not start message</td>
</tr>
<tr>
<td></td>
<td>• login – Event successful login message</td>
</tr>
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<td></td>
<td>Contd..</td>
</tr>
<tr>
<td>&lt;event-type&gt;</td>
<td>&lt;event-name&gt;</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>system contd..</td>
<td>• login-fail – Event login fail message. Occurs when user authentication fails.</td>
</tr>
<tr>
<td></td>
<td>• login-fail-access – Event login fail access message. Occurs in case of access violation.</td>
</tr>
<tr>
<td></td>
<td>• login-fail-bad-role – Event login fail bad role message. Occurs when user uses an invalid role to logon.</td>
</tr>
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<td></td>
<td>• logout – Event logout message</td>
</tr>
<tr>
<td></td>
<td>• maat-light – Event action on Research in Motion (RIM) radio(s) from the Maat light module</td>
</tr>
<tr>
<td></td>
<td>• panic – Event panic message</td>
</tr>
<tr>
<td></td>
<td>• periodic-heart-beat – Event periodic heartbeat message</td>
</tr>
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<td></td>
<td>• proctstop – Event proc stop message</td>
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<td></td>
<td>• server-unreachable – Event server-unreachable message</td>
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<td></td>
<td>• system-autoup-disable – Event system autoup disable message</td>
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<td></td>
<td>• system-autoup-enable – Event system autoup enable message</td>
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<td>• t5-config-error – Event t5-config-error message</td>
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<tr>
<td></td>
<td>• ui-user-auth-fail – Event user authentication fail message</td>
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<tr>
<td></td>
<td>• ui-user-auth-success – Event user authentication success message</td>
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<td>• warm-start – Event warm start message</td>
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<tr>
<td></td>
<td>• warm-start-recover – Event recovery from warm start message</td>
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<tr>
<td>test</td>
<td>Enables and configures the logging of the test module related event messages</td>
</tr>
<tr>
<td></td>
<td>• testalert – Event test alert message</td>
</tr>
<tr>
<td></td>
<td>• testargs – Event test arguments message</td>
</tr>
<tr>
<td></td>
<td>• testcrit – Event test critical message</td>
</tr>
<tr>
<td></td>
<td>• testdebug – Event test debug message</td>
</tr>
<tr>
<td></td>
<td>• testemerg – Event test emergency message</td>
</tr>
<tr>
<td></td>
<td>• testerr – Event test error message</td>
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<tr>
<td></td>
<td>• testinfo – Event test information message</td>
</tr>
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<td></td>
<td>• testnotice – Event test notice message</td>
</tr>
<tr>
<td></td>
<td>• testwarn – Event test warning message</td>
</tr>
<tr>
<td>vrrp</td>
<td>Enables and configures the logging of Virtual Router Redundancy Protocol (VRRP) related event messages</td>
</tr>
<tr>
<td></td>
<td>• vrrp-monitor-change – Event VRRP monitor link state change message</td>
</tr>
<tr>
<td></td>
<td>• vrrp-state-change – Event VRRP state transition message</td>
</tr>
<tr>
<td></td>
<td>• vrrp-vip-subnet-mismatch – Event VRRP IP not overlapping with an interface addresses message</td>
</tr>
<tr>
<td>webf</td>
<td>Enables and configures the logging of the Web Filtering (webf) module related events</td>
</tr>
<tr>
<td></td>
<td>• malform-url-request – Event malformed URL request message</td>
</tr>
<tr>
<td></td>
<td>• no-parent-engine – Event ‘no session to URL classification server’ message</td>
</tr>
<tr>
<td></td>
<td>• srvr-connect-fail – Event URL classification server unreachable message</td>
</tr>
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<td></td>
<td>• url-blocked – Event URL blocked message</td>
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<tr>
<td></td>
<td>• webf-lic-acquired – Event webf license acquired message</td>
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<tr>
<td></td>
<td>• webf-lic-missing – Event Event webf license missing message</td>
</tr>
<tr>
<td></td>
<td>• webf-lic-revoked – Event webf license revoked message</td>
</tr>
<tr>
<td><code>&lt;event-type&gt;</code></td>
<td><code>&lt;event-name&gt;</code></td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>wips</td>
<td>Enables and configures the logging of the Wireless IPS module related event messages</td>
</tr>
<tr>
<td></td>
<td>• air-termination-active – Event air termination active message</td>
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<tr>
<td></td>
<td>• air-termination-ended – Event air termination ended message</td>
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<tr>
<td></td>
<td>• air-termination-inactive – Event air termination inactive message</td>
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<tr>
<td></td>
<td>• air-termination-initiated – Event air termination initiated message</td>
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<td></td>
<td>• rogue-ap-active – Event rogue AP active message</td>
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<tr>
<td></td>
<td>• rogue-ap-inactive – Event rogue AP inactive message</td>
</tr>
<tr>
<td></td>
<td>• unsanctioned-ap-active – Event unsanctioned AP active message</td>
</tr>
<tr>
<td></td>
<td>• unsanctioned-ap-inactive – Event unsanctioned AP inactive message</td>
</tr>
<tr>
<td></td>
<td>• unsanctioned-ap-status-change – Event unsanctioned AP changed state message</td>
</tr>
<tr>
<td></td>
<td>• wips-client-blacklisted – Event WIPS client blacklisted message</td>
</tr>
<tr>
<td></td>
<td>• wips-client-rem-blacklist – Event WIPS client rem blacklist message</td>
</tr>
<tr>
<td></td>
<td>• wips-event – Event WIPS event triggered message</td>
</tr>
<tr>
<td>email</td>
<td>Sends e-mail notifications to a pre configured e-mail ID</td>
</tr>
<tr>
<td>forward-to-switch</td>
<td>Forwards the messages to an external server</td>
</tr>
<tr>
<td>snmp</td>
<td>Logs an SNMP event</td>
</tr>
<tr>
<td>syslog</td>
<td>Logs an event to syslog</td>
</tr>
<tr>
<td>default</td>
<td>Performs the default action for the event</td>
</tr>
<tr>
<td>off</td>
<td>Switches the event off, when the event happens, and no action is performed</td>
</tr>
<tr>
<td>on</td>
<td>Switches the event on, when the event happens, and the configured action is taken</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FABE(config-event-system-policy-event-testpolicy)#event aaa radius-discon-msg email on forward-to-switch default snmp default syslog default
rfs7000-37FABE(config-event-system-policy-event-testpolicy)#
rfs7000-37FABE(config-event-system-policy-testpolicy)#show context event-system-policy test
    event aaa radius-discon-msg email on
rfs7000-37FABE(config-event-system-policy-testpolicy)#

nx9500-6C8809(config-event-system-policy-testpolicy)#event database database-exception syslog default forward-to-switch default email default

nx9500-6C8809(config-event-system-policy-testpolicy)#event database operation-failed syslog default forward-to-switch default email default

nx9500-6C8809(config-event-system-policy-testpolicy)#show context include-factory | grep operation-failed
    event database operation-failed syslog default forward-to-switch default email default
```

**Related Commands**

<table>
<thead>
<tr>
<th><code>&lt;command&gt;</code></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets or disables event monitoring</td>
</tr>
</tbody>
</table>
4.1.44.2.2 no

*event-system-policy-mode commands*

Negates an event monitoring configuration

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no event <EVENT-TYPE> <EVENT-NAME> [email|forward-to-switch|snmp|syslog]
   [default|on|off]
```

**Parameters**

- no <PARAMETERS>

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes event monitoring and message forwarding activity based on the parameters passed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Note:</strong></td>
<td>The system stops network monitoring for the occurrence of the specified event and no notification is sent if the event occurs.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-event-system-policy-TestPolicy)#event ap adopted syslog default
rfs7000-37FABE(config-event-system-policy-TestPolicy)#no event ap adopted syslog
```

**Related Commands**

| event | Configures the action taken for each event |
The following table lists EX3500 time-range configuration mode commands. It also provides links to other EX3500 related configuration modes:

**Table 4.22 EX3500-Time-Range-List Config Command**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
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<td>ex3500</td>
<td>Creates an EX3500 time range list and enters its configuration mode</td>
<td>page 4-194</td>
</tr>
<tr>
<td>ex3500-time-range-config-mode commands</td>
<td>Summarizes EX3500 time range list configuration mode commands</td>
<td>page 4-195</td>
</tr>
<tr>
<td>ex3500-management-policy</td>
<td>Creates an EX3500 management policy and enters its configuration mode</td>
<td>page 4-200</td>
</tr>
<tr>
<td>ex3500-qos-class-map-policy</td>
<td>Creates an EX3500 QoS class map policy and enters its configuration mode</td>
<td>page 4-218</td>
</tr>
<tr>
<td>ex3500-qos-policy-map</td>
<td>Creates an EX3500 QoS policy map and enters its configuration mode</td>
<td>page 4-226</td>
</tr>
<tr>
<td>ex3524</td>
<td>Adds a EX3524 switch to the network</td>
<td>page 4-240</td>
</tr>
<tr>
<td>ex3548</td>
<td>Adds a EX3548 switch to the network</td>
<td>page 4-242</td>
</tr>
</tbody>
</table>
4.1.45.1 ex3500

> ex3500

Creates an EX3500 time range list and enters its configuration mode

An EX3500 time range list consists of a set of periodic and absolute time range rules. Periodic time ranges recur periodically at specified time periods, such as daily, weekly, weekends, weekdays, and on specific week days, for example on every successive Mondays. Absolute time ranges are not periodic and do not recur. They consist of a range of days during a particular time period (the starting and ending days and time are fixed).

The EX3500 series switch is a Gigabit Ethernet layer 2 switch with either 24 or 48 10/100/1000-BASE-T ports, and four Small Form Factor Pluggable (SFP) transceiver slots for fiber connectivity. The EX3500 series switch can adopt to a WiNG NOC controller and be managed by it. The EX3500 time range values configured here are used in EX3500 MAC ACL firewall rules that filter an EX3500’s incoming and outgoing traffic. For more information on creating EX3500 MAC ACL rules, see ex3500 and access-group.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

Syntax
ex3500 time-range <TIME-RANGE-NAME>

Parameters
- ex3500 time-range <TIME-RANGE-NAME>

Examples
nx9500-6C8809(config)#ex3500 time-range EX3500_TimeRange_02
nx9500-6C8809(config-ex3500-time-range-EX3500_TimeRange_02)#?

EX3500 Time Range Configuration commands:
  absolute  Absolute time and date
  no        Negate a command or set its defaults
  periodic  Periodic time and date
  clrscr    Clears the display screen
  commit    Commit all changes made in this session
  do        Run commands from Exec mode
  end       End current mode and change to EXEC mode
  exit      End current mode and down to previous mode
  help      Description of the interactive help system
  revert    Revert changes
  service   Service Commands
  show      Show running system information
  write     Write running configuration to memory or terminal

nx9500-6C8809(config-ex3500-time-range-EX3500_TimeRange_02)#

Related Commands
  no  Removes this EX3500 time range list
4.1.45.2 ex3500-time-range-config-mode commands

The following table summarizes EX3500 time-range configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>absolute</td>
<td>Configures an absolute time range rule for this EX3500 time range list</td>
<td>page 4-196</td>
</tr>
<tr>
<td>periodic</td>
<td>Configures a periodic time range rule for this EX3500 time range list</td>
<td>page 4-197</td>
</tr>
<tr>
<td>no</td>
<td>Removes this EX3500 time range list settings</td>
<td>page 4-199</td>
</tr>
</tbody>
</table>
4.1.45.2.1 absolute

*ex3500-time-range-config-mode* commands

Configures an absolute time range rule for this EX3500 time range list

Absolute time ranges are not periodic and do not recur. They consist of a range of days during a particular time period.

Supported in the following platforms:

- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

```
absolute start <0-23> <0-59> <1-31> <MONTH> <2013-2037> {end <0-23> <0-59> <1-31> <MONTH> <2013-2037>}
```

**Parameters**

- `absolute start <0-23> <0-59> <1-31> <MONTH> <2013-2037> {end <0-23> <0-59> <1-31> <MONTH> <2013-2037>}`

<table>
<thead>
<tr>
<th>absolute</th>
<th>Configures an absolute time range rule settings</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>start &lt;0-23&gt; &lt;0-59&gt; &lt;1-31&gt; &lt;MONTH&gt; &lt;2013-2037&gt;</code></td>
<td>Configures the start day and time settings</td>
</tr>
<tr>
<td><code>end &lt;0-23&gt; &lt;0-59&gt; &lt;1-31&gt; &lt;MONTH&gt; &lt;2013-2037&gt;</code></td>
<td>Optional. Configures the end day and time settings</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-ex3500-time-range-EX3500-TimeRange-01)#absolute start 1 0 1 june 2015 end 1 0 30 june 2016
```

```
nx9500-6C8809(config-ex3500-time-range-EX3500-TimeRange-01)#show context ex3500 time-range EX3500-TimeRange-01
  absolute start 1 0 1 june 2015 end 1 0 30 june 2016
```

```
nx9500-6C8809(config-ex3500-time-range-EX3500-TimeRange-01)#
```

**Related Commands**

- `no` Removes this absolute time range rule from the EX3500 time range list
4.1.45.2.2 periodic

`ex3500-time-range-config-mode commands`

Configures a periodic time range rule for this EX3500 time range list.

Periodic time ranges are configured to recur based on periodicity such as daily, weekly, weekends, weekdays, and on specific week days, such as on every successive Sunday.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

```
periodic [daily|friday|monday|saturday|sunday|thursday|tuesday|wednesday|weekdays|weekend] <0-23> <0-59> to [daily|friday|monday|saturday|sunday|thursday|tuesday|wednesday|weekdays|weekend] <0-23> <0-59> rule-precedence <1-7>
```

**Parameters**

- **periodic**
  - [daily|friday|monday|saturday|sunday|thursday|tuesday|wednesday|weekdays|weekend] Configures this periodic time range’s start day. The options are:
    - daily
    - friday
    - monday
    - saturday
    - sunday
    - thursday
    - tuesday
    - wednesday
    - weekdays
    - weekend
  - <0-23> <0-59> After specifying the start day, specify the start time in hours (24 hours format) and minutes.
    - <0-23> – Specify the start time from 0 - 23 hours.
    - <0-59> – Specify the start time from 0 - 59 minutes.

  For example, if the values provided are 12 hours and 30 minutes, the start time is 12:30 A.M on the specified day.

- **to**
  - [daily|friday|monday|saturday|sunday|thursday|tuesday|wednesday|weekdays|weekend]
  - Configures this periodic time range’s end day. This is the day when the time range ends.
    - The options available changes depending on the **start day** configured. The options are:
      - <0-23> <0-59> – Select this option to end the time range on the same day as it starts.
      - daily – Select this option if the time range starts and ends every day at a specified time
      - friday – Select this option if the time range ends on Fridays
      - monday – Select this option if the time range ends on Mondays
      - saturday – Select this option if the time range ends on Saturdays
      - sunday – Select this option if the time range ends on Sundays
```

Contd..
Examples

nx9500-6C8809(config-ex3500-time-range-EX3500-TimeRange-01)#periodic daily 1 10 to daily 23 10 rule-precedence 1

nx9500-6C8809(config-ex3500-time-range-EX3500-TimeRange-01)#show context ex3500 time-range EX3500-TimeRange-01
  periodic daily 1 10 to daily 23 10 rule-precedence 1
  absolute start 1 0 1 june 2015 end 1 0 30 june 2016

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes this periodic time range rule from the EX3500 time range list</td>
</tr>
</tbody>
</table>

Note:
- If the time range does not end on the same day, select the end day, and then specify the end time, or else just specify the end time.
- In case of time ranges starting and ending on the same day, ensure that the end time (hours and minutes) is not lower than the specified start time.
4.1.45.2.3  no

*ex3500-time-range-config-mode commands*

Removes this EX3500 time range list settings

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

no [absolute|periodic]

no absolute

no periodic [daily|friday|monday|saturday|sunday|thursday|tuesday|wednesday|weekdays|weekend] <0-23> <0-59> to [daily|friday|monday|saturday|sunday|thursday|tuesday|wednesday|weekdays|weekend]

**Parameters**
- no <PARAMETERS>

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes this EX3500 time range list settings based on the parameters passed</th>
</tr>
</thead>
</table>

**Examples**

```
nx9500-6C8809(config-ex3500-time-range-EX3500-TimeRange-01)#show context
ex3500 time-range EX3500-TimeRange-01
   periodic daily 1 10 to daily 23 10 rule-precedence 1
   absolute start 1 0 1 june 2015 end 1 0 30 june 2016
nx9500-6C8809(config-ex3500-time-range-EX3500-TimeRange-01)#
```

```
nx9500-6C8809(config-ex3500-time-range-EX3500-TimeRange-01)#no periodic daily 1 10 to daily 23 10 rule-precedence 1
nx9500-6C8809(config-ex3500-time-range-EX3500-TimeRange-01)#show context
ex3500 time-range EX3500-TimeRange-01
   absolute start 1 0 1 june 2015 end 1 0 30 june 2016
nx9500-6C8809(config-ex3500-time-range-EX3500-TimeRange-01)#
```
### 4.1.46 `ex3500-management-policy`

**Global Configuration Commands**

The following table lists EX3500 management policy configuration mode commands:

Table 4.24 **EX3500-Management-Policy Config Command**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ex3500-management-policy</code></td>
<td>Creates an EX3500 management policy and enters its configuration mode</td>
<td>page 4-201</td>
</tr>
<tr>
<td><code>ex3500-management-policy config commands</code></td>
<td>Summarizes EX3500 management policy configuration mode commands</td>
<td>page 4-203</td>
</tr>
<tr>
<td><code>ex3500</code></td>
<td>Creates an EX3500 time range list and enters its configuration mode</td>
<td>page 4-193</td>
</tr>
<tr>
<td><code>ex3500-qos-class-map-policy</code></td>
<td>Creates an EX3500 QoS class map policy and enters its configuration mode</td>
<td>page 4-218</td>
</tr>
<tr>
<td><code>ex3500-qos-policy-map</code></td>
<td>Creates an EX3500 QoS policy map and enters its configuration mode</td>
<td>page 4-226</td>
</tr>
<tr>
<td><code>ex3524</code></td>
<td>Adds a EX3524 switch to the network</td>
<td>page 4-240</td>
</tr>
<tr>
<td><code>ex3548</code></td>
<td>Adds a EX3548 switch to the network</td>
<td>page 4-242</td>
</tr>
</tbody>
</table>
4.1.46.1 ex3500-management-policy

ex3500-management-policy

Creates an EX3500 management policy and enters its configuration mode. Once configured and applied on a
EX3500 switch, the management policy controls access to the switch from management stations using SNMP.
The EX3500 management policy is either applied:

- Individually on an adopted EX3500 series switch (in the device configuration mode), or
- To a EX3524 and/or EX3548 profile, which is then applied to an adopted EX3500 series switch.

EX3500 devices (EX3524 and EX3548) are layer 2 Gigabit Ethernet switches with either 24 or 48 10/100/1000-
BASE-T ports, and four SFP transceiver slots for fiber connectivity. Each 10/100/1000 Mbps port supports both the
IEEE 802.3af and IEEE 802.3at-2009 PoE standards. An EX3500 switch has an SNMP-based management agent
that provides both in-band and out-of-band management access. The EX3500 switch utilizes an embedded HTTP
Web agent and CLI, which in spite of being different from that of the WiNG operating system provides WiNG
controllers PoE and port management resources.

Going forward NX9500, NX7500, NX6500, NX4500 WiNG managed series service platforms and WiNG VMs can
discover, adopt, and partially manage EX3500 series Ethernet switches without modifying the proprietary
operating system running the EX3500 switches. The WiNG service platforms utilize standardized WiNG interfaces
to push configuration files to the EX3500 switches, and maintain a translation layer, understood by the EX3500
switch, for statistics retrieval.

WiNG can partially manage an EX3500 without using DHCP option 193, provided the EX3500 is directly
configured to specify the IPv4 addresses of potential WiNG adopters. To identify the potential WiNG adopter, in
the EX3500’s device configuration mode specify the adopter’s IPv4 address using the
controller > host > <IP-ADDRESS> command. WiNG service platforms leave the proprietary operating system
running the EX3500 switches unmodified, and partially manage them utilizing standardized WiNG interfaces.
WiNG service platforms use a translation layer to communicate with the EX3500.

Supported in the following platforms:

- Wireless Controller — RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX9500

Syntax

ex3500-management-policy <POLICY-NAME>

Parameters

- ex3500-management-policy <POLICY-NAME>

Examples

nx9500-6C8809(config)#ex3500-management-policy test
nx9500-6C8809(config-ex3500-management-policy-test)#?

EX3500 Management Mode commands:

enable Modifies enable password parameters
http Hyper Text Terminal Protocol (HTTP)
memory Memory utilization
no Negate a command or set its defaults
process-cpu Process-cpu utilization
snmp-server Enable SNMP server configuration
ssh Secure Shell server connections
username Login TACACS server port
clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
db End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
</tr>
</tbody>
</table>

nx9500-6C8809(config-ex3500-management-policy-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes this EX3500 management policy</td>
</tr>
</tbody>
</table>
## 4.1.46.2 ex3500-management-policy config commands

The following table summarizes EX3500 management policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>enable</code></td>
<td>Configures an executive password for this EX3500 management policy</td>
<td>page 4-204</td>
</tr>
<tr>
<td><code>http</code></td>
<td>Configures the HTTP server settings used to authenticate HTTP connection to a EX3500 switch</td>
<td>page 4-205</td>
</tr>
<tr>
<td><code>memory</code></td>
<td>Configures the EX3500’s memory utilization rising (upper) and falling (lower) threshold values</td>
<td>page 4-206</td>
</tr>
<tr>
<td><code>process-cpu</code></td>
<td>Configures the EX3500’s CPU (processor) utilization rising (upper) and falling (lower) threshold values</td>
<td>page 4-207</td>
</tr>
<tr>
<td><code>snmp-server</code></td>
<td>Configures Simple Network Management Protocol (SNMP) server settings. Once configured and applied on an EX3500 switch, the management policy controls access to the switch from management stations using SNMP.</td>
<td>page 4-208</td>
</tr>
<tr>
<td><code>ssh</code></td>
<td>Configures the SSH server settings used to authenticate Secure Shell (SSH) connection to a EX3500 switch</td>
<td>page 4-214</td>
</tr>
<tr>
<td><code>username</code></td>
<td>Configures a EX3500 switch user settings</td>
<td>page 4-215</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Removes or reverts this EX3500 management policy settings</td>
<td>page 4-216</td>
</tr>
</tbody>
</table>
4.146.2.1 enable

> ex3500-management-policy config commands

Configures an executive password for this EX3500 management policy

Each EX3500 management policy can have a unique executive password with its own privilege level assigned. Utilize these passwords as specific EX3500 management sessions require priority over others.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

Syntax

`enable password [0|7|level]
`enable password [0|7] <PASSWORD>
`enable password level <0-15> [0 <PASSWORD>|7 <PASSWORD>]

Parameters

- `enable password [0|7] <PASSWORD>`
  - Creates a new executive password for this EX3500 management policy. The password could be in clear text or encrypted
  - 0 – Configures a clear text password using ASCII characters (should be 1 - 32 characters long)
  - 7 – Configures an encrypted password using HEX characters (should be 32 characters long)
  - `<PASSWORD>` – Specify the password.

- `enable password level <0-15> [0 <PASSWORD>|7 <PASSWORD>]`
  - Creates a new executive password for this EX3500 management policy and sets its privilege level
  - `<0-15>` – Specify the privilege level for this executive password from 0 - 15. Lower values have higher priority, to slot and prioritize executive passwords and EX3500 management sessions.
  - `<PASSWORD>` – Specify the password.

Examples

```
nx9500-6C8809(config-ex3500-management-policy-test)#enable password level 3 7
1234567890123456789012345678901234567890123456789012345678901234567
```

```
nx9500-6C8809(config-ex3500-management-policy-test)#show context ex3500-management-policy-test
  enable password level 3 7 12345678901234567890123456789012345678901234567
  snmp-server notify-filter 1 remote 127.0.0.1
```

```
nx9500-6C8809(config-ex3500-management-policy-test)#
```

Related Commands

`no`
- Removes an executive password from this EX3500 management policy
# http

> **ex3500-management-policy config commands**

Configures the HTTP server settings used to authenticate HTTP connection to a EX3500 switch. Management access to an EX3500 switch can be enabled/disabled as required using separate interfaces and protocols (HTTP, SSH). Disabling un-used and insecure interfaces and unused management services can dramatically reduce an attack footprint and free resources within an EX3500 management policy.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

## Syntax

```
http [port <1-65535>|secure-port <1-65535>|secure-server|server]
```

## Parameters

- **http [port <1-65535>|secure-port <1-65535>|secure-server|server**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>http port &lt;1-65535&gt;</td>
<td>Configures the HTTP port number. This is the port used to connect to the HTTP server.</td>
</tr>
<tr>
<td>secure-port &lt;1-65535&gt;</td>
<td>Enables secure HTTP connection over a designated secure port. Ensure that the HTTP secure server is enabled before specifying the secure-server port.</td>
</tr>
<tr>
<td>secure-server</td>
<td>Enables HTTP secure server. This option is disabled by default.</td>
</tr>
<tr>
<td>server</td>
<td>Enables HTTP server. This option is enabled by default. Consequently, HTTP management access is allowed by default.</td>
</tr>
</tbody>
</table>

## Examples

```
nx9500-6C8809(config-ex3500-management-policy-test)#http secure-server
```

```
nx9500-6C8809(config-ex3500-management-policy-test)#show context
ex3500-management-policy test
http secure-server
enable password level 3 7 123456789012030405060708092991
snmp-server notify-filter 1 remote 127.0.0.1
```

## Related Commands

- **no**

  Reverts to default HTTP server settings (HTTP server enabled, HTTP port 80)
4.1.46.2.3 memory

`ex3500-management-policy config commands`

Configures the EX3500’s memory utilization rising (upper) and falling (lower) threshold values. Once configured, the system sends a notification when the memory utilization exceeds the specified rising limit or falls below the specified falling limit.

By customizing an EX3500’s memory and CPU utilization’s upper and lower thresholds, you can avoid over utilization of the EX3500’s processor capacity when sharing network resources with an NX series service platform or a WiNG VM.

Supported in the following platforms:
  - Wireless Controller — RFS7000
  - Service Platforms — NX7500, NX9500

**Syntax**

```
memory [falling-threshold|rising-threshold] <1-100>
```

**Parameters**

- `memory [falling-threshold|rising-threshold] <1-100>`

<table>
<thead>
<tr>
<th>memory</th>
<th>Configures the EX3500’s memory utilization rising and falling threshold values. The system generates a notification when either of these limits is exceeded.</th>
</tr>
</thead>
</table>
| falling-threshold `<1-100>` | Configures the falling threshold for the EX3500 memory utilization  
  • `<1-100>` – Specify the falling threshold as a percentage from 1 - 100. The default is 70%. |
| rising-threshold `<1-100>` | Configures the rising threshold for the EX3500’s memory utilization  
  • `<1-100>` – Specify the rising threshold as a percentage from 1 - 100. The default is 90%. |

**Examples**

```
nx9500-6C8809(config-ex3500-management-policy-test)#memory falling-threshold 50
nx9500-6C8809(config-ex3500-management-policy-test)#memory rising-threshold 95
nx9500-6C8809(config-ex3500-management-policy-test)#show context
ex3500-management-policy test
  http secure-server
  enable password level 3 7 12345678901020304050607080929291
  snmp-server notify-filter 1 remote 127.0.0.1
  memory falling-threshold 50
  memory rising-threshold 95
nx9500-6C8809(config-ex3500-management-policy-test)#
```

**Related Commands**

```
no
```

Reverts the memory utilization’s falling-threshold and/or rising threshold to 70% and 90% respectively
4.1.46.2.4 process-cpu

ex3500-management-policy config commands

Configures the EX3500’s CPU (processor) utilization rising (upper) and falling (lower) threshold values. Once configured, the system sends a notification when the CPU utilization exceeds the specified rising limit or falls below the specified falling limit.

By customizing an EX3500’s memory and CPU utilization’s upper and lower thresholds, you can avoid over utilization of the EX3500’s processor capacity when sharing network resources with an NX series service platform or a WiNG VM.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

Syntax
process-cpu [falling-threshold|rising-threshold] <1-100>

Parameters
- process-cpu [falling-threshold|rising-threshold] <1-100>

| process-cpu | Configures the EX3500’s CPU utilization rising and falling threshold values. The system generates a notification when either of these limits is exceeded. |
| falling-threshold | Configures the falling threshold for the EX3500’s CPU utilization |
| <1-100> | • <1-100> – Specify the falling threshold as a percentage from 1 - 100. The default is 70%. |
| rising-threshold | Configures the rising threshold for the EX3500’s CPU utilization |
| <1-100> | • <1-100> – Specify the rising threshold as a percentage from 1 - 100. The default is 90%. |

Examples
nx9500-6C8809(config-ex3500-management-policy-test)#process-cpu falling-threshold 60
nx9500-6C8809(config-ex3500-management-policy-test)#process-cpu rising-threshold 80
nx9500-6C8809(config-ex3500-management-policy-test)#show context
ex3500-management-policy test
http secure-server
enable password level 3 7 12345678901020304050607080929291
snmp-server notify-filter 1 remote 127.0.0.1
memory falling-threshold 50
memory rising-threshold 95
process-cpu falling-threshold 60
process-cpu rising-threshold 80
nx9500-6C8809(config-ex3500-management-policy-test)#

Related Commands

| no | Reverts the CPU utilization’s falling-threshold and/or rising threshold to 70% and 90% respectively |
4.146.2.5  snmp-server

Configures Simple Network Management Protocol (SNMP) server settings. Once configured and applied on a
EX3500 switch, the management policy controls access to the switch from management stations using SNMP.
SNMP is an application layer protocol that facilitates the exchange of management information between the
management stations and a managed EX3500 switch. SNMP-enabled devices listen on port 162 (by default) for
SNMP packets from the management server. SNMP uses read-only and read-write community strings as an
authentication mechanism to monitor and configure supported devices. The read-only community string is used to
gather statistics and configuration parameters from a supported wireless device. The read-write community string
is used by a management server to set device parameters. SNMP is generally used to monitor a system’s
performance and other parameters.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

Syntax

```
snmp-server {community|contact|enable|engine-id|group|host|location|notify-filter|
user|view}
```

```
snmp-server {community <STRING> {ro|rw}}
```

```
snmp-server {contact <NAME>}
```

```
snmp-server {enable traps {authentication|link-up-down}}
```

```
snmp-server {engine-id [local <WORD>|remote <IP> <WORD>]}
```

```
snmp-server {group <GROUP-NAME> [v1|v2c|v3 [auth|noauth|priv]] {notify <WORD>|read <WORD>|write <WORD>}}
```

```
snmp-server {host <IP> [<STRING>|inform]}
```

```
{udp-port <1-65535>}
```

```
snmp-server {host <IP> inform [retry <0-255>|timeout <0-2147483647>] <STRING>
version [v2c|v3 [auth|noauth|priv]] {udp-port <1-65535>}}
```

```
snmp-server {location <WORD>}
```

```
snmp-server {notify-filter <WORD> remote <IP>}
```

```
{udp-port <1-65535>}
```

```
snmp-server {user <USER-NAME> <GROUP-NAME> [remote-host<v1|v2c|v3]}
```

```
{udp-port <1-65535>}
```

```
snmp-server {user <USER-NAME> <GROUP-NAME> remote-host <IP> v3 [auth|encrypted auth]
[md5|sha] <WORD> {priv [3des|aes128|aes192|aes256|des56] <WORD>}}
```

```
snmp-server {user <USER-NAME> <GROUP-NAME> [v1|v2c|v3]}
```

```
```

```
snmp-server {view <VIEW-NAME> <OID-TREE-STRING> [excluded|included]}
```

Parameters
- snmp-server {community <STRING> {ro|rw}}

| snmp-server community <STRING> {ro|rw} | Configures SNMP-server related settings |
|----------------------------------------|----------------------------------------|
| • community – Optional. Configures an SNMP community access string used to authorize management access by clients using SNMP v1, v2c, or v3 |
| • <STRING> – Specify the SNMP community access string (should not exceed 32 characters). | Contd.. |
After specifying the string, optionally specify the access type associated with it.

- **ro** – Optional. Provides read-only access with this SNMP community string. Allows authorized clients to only retrieve *Management Information Base* (MIB) objects. This is the default setting.
- **rw** – Optional. Provides read-write access with this SNMP community string. Allows authorized clients to retrieve as well as modify MIB objects.

**Note:** You can configure a maximum of five (5) community strings per EX3500 management policy.

- **snmp-server contact** `<NAME>`

   Configures SNMP-server related settings
   - contact – Optional. Configures the system’s contact information
     - `<NAME>` – Specify the contact person’s name (should not exceed 255 characters).

- **snmp-server enable traps** `{authentication|link-up-down}`

   Configures SNMP-server related settings
   - enable traps – Optional. Enables the EX3500 switch to send following SNMP traps or notifications:
     - authentication – Optional. Enables SNMP authentication trap. This option is disabled by default.
     - link-up-down – Optional. Enables SNMP link up and link down traps. This option is disabled by default.

   **Note:** If the command is executed without either of the above mentioned trap options, the system enables both authentication and link-up-down traps.

   **Note:** If enabling SNMP traps, use the `snmp-server > host` command to specify the host(s) receiving the SNMP notifications.

- **snmp-server engine-id** `{local <WORD>|remote <IP> <WORD>}`

   Configures SNMP-server related settings
   - engine-id – Optional. Configures an identification string for the SNMPv3 engine. The SNMP engine is an independent SNMP agent residing either on the logged switch or on a remote device. It prevents message replay, delay, and redirection. In SNMPv3, the engine ID in combination with user passwords generates the security keys that is used for SNMPv3 packet authentication and encryption.
     - local – Configures the SNMP engine on the logged switch
       - `<WORD>` – Specify the hexadecimal engine ID string identifying the SNMP engine (should be 9 - 64 characters in length).
     - remote `<IP>` `<WORD>` – Configures a remote device as the SNMP engine
       - `<IP>` – Specify the remote device’s IP address.
       - `<WORD>` – Specify the hexadecimal engine ID string identifying the SNMP engine (should be 9 - 64 characters in length).

   Configure the remote engine ID when using SNMPv3 informs. The remote ID configured here is used to generate the security digest for authentication and encryption of packets exchanged between the switch and the remote host user. SNMP passwords are localized using the engine ID of the authoritative agent. For informs, the authoritative SNMP agent is the remote agent. You therefore need to configure the remote agent’s SNMP engine ID before you can send proxy requests or informs to it.
```
- **snmp-server** {group <GROUP-NAME> [v1|v2c|v3 [auth|noauth|priv]] {notify <WORD>|read <WORD>|write <WORD>}}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| **snmp-server group** <GROUP-NAME> | Configures SNMP-server related settings
  - **group** – Optional. Configures an SNMP user group, mapping SNMP users to SNMP views
    - **<GROUP-NAME>** – Specify the SNMP group name (should not exceed 32 characters).
  - **[v1|v2c|v3 [auth|noauth|priv]]**
    - Configures the SNMP version used for authentication by this user group
      - **v1** – Configures the SNMP version as v1.
      - **v2c** – Configures SNMP version as v2c.
      - **v3** – Configures the SNMP version as v3. If using SNMP v3, specify the authentication and encryption levels.
        - **auth** – Uses SNMP v3 with authentication and no privacy.
        - **noauth** – Uses SNMP v3 with no authentication and no privacy.
        - **priv** – Uses SNMP v3 with authentication and privacy.
| **notify <WORD>** | Optional. Configures the notification view string
  - **<WORD>** – Specify the string (should not exceed 32 characters).
| **read <WORD>** | Optional. Configures the read view string
  - **<WORD>** – Specify the string (should not exceed 32 characters).
| **write <WORD>** | Optional. Configures the write view string
  - **<WORD>** – Specify the string (should not exceed 32 characters).

- **snmp-server** {host <IP> <STRING> version [v1|v2c|v3 [auth|noauth|priv]]} {udp-port <1-65535>}}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| **snmp-server host** <IP> | Configures SNMP-server related settings
  - **host** – Optional. Configures the host(s) receiving the SNMP notifications. At least one SNMP server host should be configured in order to configure the switch to send notifications.
    - **<IP>** – Specify the SNMP host’s IP address.
**Note**: You can configure a maximum of five (5) SNMP trap recipients per EX3500 management policy.
**Note**: Ensure that SNMP trap notification is enabled.
| **<STRING>** | Configures the SNMP community string. You can configure the SNMP community string here, or else use the string configured using the **snmp-server > community <STRING> > [ro|rw]** command. It is recommended that you configure the SNMP community string prior to configuring the SNMP host.
  - **<STRING>** – Specify the community string. The string configured here is sent in the SNMP traps to the SNMPv1 or SNMPv2c hosts.
| **version [v1|v2c|v3 [auth|noauth|priv]]** | Configures the SNMP version used
  - **v1** – Configures the SNMP version as 1. This is the default setting.
  - **v2c** – Configures SNMP version as 2c.
  - **v3** – Configures the SNMP version as 3. If using SNMPv3, specify the authentication and encryption levels.
    - **auth** – Uses SNMP v3 with authentication and no privacy.
    - **noauth** – Uses SNMP v3 with no authentication and no privacy.
    - **priv** – Uses SNMP v3 with authentication and privacy. |
### Global Configuration Commands

**Global Configuration Commands** 4-211

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `snmp-server host <IP>` | Configures SNMP-server related settings
  - host – Optional. Configures the host(s) receiving the SNMP notifications
  - <IP> – Specify the SNMP host’s IP address.
  **Note:** You can configure a maximum of five (5) SNMP trap recipients per EX3500 management policy.
  **Note:** Ensure that SNMP trap notification is enabled.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `inform [retry <0-255>|timeout <0-2147483647>]<STRING>` | Enables sending of SNMP notifications as inform messages, and configures inform message settings.
  - retry <0-255> – Configures the maximum number attempts made to re-send an inform message in case the specified SNMP host does not acknowledge receipt.
  - timeout <0-2147483647> – Configures the interval, in seconds, to wait for an acknowledgment from the SNMP host before re-sending an inform message
  - <STRING> – Specify the community string. The string configured here is sent in the SNMP inform messages to the SNMPv2c or SNMPv3 hosts.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `udp-port <1-65535>` | Optional. After specifying the SNMP version, optionally specify the host UDP port
  - <1-65535> – Specify the UDP port. The default is 162.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `snmp-server {location <WORD>}` | Configures SNMP-server related settings
  - location – Optional. Configures the EX3500’s location string
  - <WORD> – Specify the location (should not exceed 255 characters).
### snmp-server {notify-filter <WORD> remote <IP>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>notify-filter</td>
<td>Optional. Modifies the SNMP server’s notify filter.</td>
</tr>
<tr>
<td>remote</td>
<td>Specifies the remote host’s IP address.</td>
</tr>
</tbody>
</table>

### snmp-server {user <USER-NAME> <GROUP-NAME> remote <IP> v3 {auth|encrypted auth} [md5|sha] <WORD> \{priv \[3des|aes128|aes192|aes256|des56\] <WORD>\}}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user</td>
<td>Optional. Configures the name of the SNMP user (connecting to the SNMP agent) and adds the user to an existing SNMP group. It also specifies the SNMP version type used. In case of SNMP version 3, this command also configures the remote host’s IP address and the authentication type used.</td>
</tr>
<tr>
<td>remote</td>
<td>Specifies the remote host’s IP address.</td>
</tr>
<tr>
<td>v3</td>
<td>Enables encryption. When enabled all communications between the user and the SNMP engine are encrypted. After enabling encryption, specify the authentication type and configure the authentication password.</td>
</tr>
<tr>
<td>auth</td>
<td>Specifies the authentication type used and configures the authentication password.</td>
</tr>
<tr>
<td>encrypted</td>
<td>Enables encryption.</td>
</tr>
<tr>
<td>md5</td>
<td>Uses MD5 to authenticate the user.</td>
</tr>
<tr>
<td>sha</td>
<td>Uses SHA to authenticate the user.</td>
</tr>
<tr>
<td>priv</td>
<td>Optional. Uses SNMPv3 with privacy. Select one of the privacy options: des, aes128, aes192, aes256, des56</td>
</tr>
<tr>
<td>des56</td>
<td>Specifies the privacy password. If the 'encrypted' option is not being used, enter an 8 - 40 characters ASCII password. Whereas, in case of an encrypted password enter a HEX characters password of 32 characters.</td>
</tr>
</tbody>
</table>

### snmp-server user <USER-NAME> <GROUP-NAME> remote <IP> v3

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>remote</td>
<td>Configures the remote host on which the SNMPv3 engine is running.</td>
</tr>
<tr>
<td>v3</td>
<td>Specifies the remote host’s IP address.</td>
</tr>
<tr>
<td>auth</td>
<td>Specifies the authentication type used and configures the authentication password.</td>
</tr>
<tr>
<td>encrypted</td>
<td>Enables encryption.</td>
</tr>
<tr>
<td>md5</td>
<td>Uses MD5 to authenticate the user.</td>
</tr>
<tr>
<td>sha</td>
<td>Uses SHA to authenticate the user.</td>
</tr>
<tr>
<td>priv</td>
<td>Optional. Uses SNMPv3 with privacy. Select one of the privacy options: des, aes128, aes192, aes256, des56</td>
</tr>
<tr>
<td>des56</td>
<td>Specifies the privacy password. If the 'encrypted' option is not being used, enter an 8 - 40 characters ASCII password. Whereas, the encrypted password should be 32 HEX characters.</td>
</tr>
</tbody>
</table>
### Global Configuration Commands

- **snmp-server {user <USER-NAME> <GROUP-NAME> [v1|v2c|v3]}

  Configures SNMP-server related settings
  - user – Optional. Configures the name of the SNMP user (connecting to the SNMP agent) and adds the user to an existing SNMP group. It also specifies the SNMP version type used. In case of SNMPv3, this command also configures the authentication type used and the enables encryption.
  - <USER-NAME> – Specify the user’s name (should not exceed 32 characters).
  - <GROUP-NAME> – Specify the SNMP group name to which this user is assigned.
  - [v1|v2c|v3] – After specifying the group name, specify the SNMP version used.

  **Note:** If using SNMP version 3, optionally specify the authentication type and the corresponding authentication password used. Please see previous table for SNMPv3 authentication and encryption configuration details.

- **snmp-server {view <VIEW-NAME> <OID-TREE-STRING> [excluded|included]}

  Configures SNMP-server related settings
  - view – Optional. Creates an SNMP view. SNMP views are used to control user access to the MIB.
  - <VIEW-NAME> – Provide a name for this SNMP view (should not exceed 32 characters).
  - <OID-TREE-STRING> [excluded|included] – Configures the object identifier (OID) of a branch within the MIB tree

  **Example**

  nx9500-6C8809(config-ex3500-management-policy-test)#snmp-server enable traps
  nx9500-6C8809(config-ex3500-management-policy-test)#snmp-server host 192.168.13.10 snmpteststring version 1 udp-port 170
  nx9500-6C8809(config-ex3500-management-policy-test)#snmp-server host 1.2.3.4 inform retry 2 test version 3 auth udp-port 180
  nx9500-6C8809(config-ex3500-management-policy-test)#snmp-server engine-id local 1234567890
  nx9500-6C8809(config-ex3500-management-policy-test)#show context
  http secure-server
  enable password level 3 7 12345678901020304050607080929291
  snmp-server enable traps authentication
  snmp-server notify-filter 3 remote 1.2.3.4
  snmp-server notify-filter 1 remote 127.0.0.1
  snmp-server notify-filter 2 remote 192.168.13.10
  snmp-server host 1.2.3.4 inform timeout 1500 retry 2 test version 3 auth udp-port 180
  snmp-server host 192.168.13.10 snmpteststring version 1 udp-port 170
  snmp-server engine-id local 1234567890
  memory falling-threshold 50
  memory rising-threshold 95
  process-cpu falling-threshold 60
  process-cpu rising-threshold 80
  nx9500-6C8809(config-ex3500-management-policy-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes SNMP server related settings or reverts them to default</td>
</tr>
</tbody>
</table>
### 4.1.46.2.6 ssh

#### ex3500-management-policy config commands

Configures the SSH server settings used to authenticate Secure Shell (SSH) connection to a EX3500 switch.

Management access to an EX3500 switch can be enabled/disabled as required using separate interfaces and protocols (HTTP, SSH). Disabling un-used and insecure interfaces and unused management services can dramatically reduce an attack footprint and free resources within an EX3500 management policy.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

#### Syntax

```bash
ssh [authentication-retries <1-5>|server|server-key size <512-1024>|timeout <1-120>]
```

#### Parameters

- `ssh [authentication-retries <1-5>|server|server-key size <512-1024]|timeout <1-120>]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ssh</code></td>
<td>Enables SSH management access to an EX3500 switch. This option is disabled by default. Use this command to configure SSH access settings.</td>
</tr>
</tbody>
</table>
| `authentication-retries <1-5>` | Configures the maximum number of retries made to connect to the SSH server resource.  
  - `<1-5>` – Specify a value from 1 - 5. The default setting is 3. |
| `server`    | Enables SSH server connection                                                |
| `server-key size <512-1024>` | Configures the SSH server key size.  
  - `<512-1024>` – Specify the SSH server key from 512 - 1,024. The default length is 768. |
| `timeout <1-120>` | Configures the SSH server resource inactivity timeout value in seconds. When the specified time is exceeded, the SSH server resource becomes unreachable and must be re-authenticated.  
  - `<1-120>` – Specify a value from 1 120 seconds. The default is 120 seconds. |

#### Examples

```bash
nx9500-6C8809(config-ex3500-management-policy-test)#ssh authentication-retries 4
nx9500-6C8809(config-ex3500-management-policy-test)#ssh timeout 90
nx9500-6C8809(config-ex3500-management-policy-test)#ssh server-key size 600
nx9500-6C8809(config-ex3500-management-policy-test)#ssh server
nx9500-6C8809(config-ex3500-management-policy-test)#show context
ex3500-management-policy test
ssh server
  ssh authentication-retries 4
  ssh timeout 90
  ssh server-key size 600
http secure-server
  enable password level 3 7 12345678901020304050607080929291
snmp-server enable traps authentication
--More--
nx9500-6C8809(config-ex3500-management-policy-test)#
```

#### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables SSH management access to an EX3500 switch</td>
</tr>
</tbody>
</table>
4.1.46.2.7 **username**

Use the `username` command in the configuration mode to configure a user for the EX3500 switch.

**Syntax**

```
username <USER-NAME> [access-level <0-15>|nopassword|password [0|7] <PASSWORD>]
```

**Parameters**

- **username**: Configures the TACACS server port username.
  - `<USER-NAME>`: Specify the user name (should not exceed 32 characters).

- **access-level**: Configures the access level for this user. This value determines the access priority of each user requesting access and interoperability with EX3500 switch.
  - `<0-15>`: Specify the access level from 0 - 15. The default is 0.

- **nopassword**: Allows user to login without a password.

- **password [0|7]** `<PASSWORD>`: Configures the password for this user.
  - `0`: Configures a plain text password.
  - `7`: Configures an encrypted password (should be 32 characters in length).
  - `<PASSWORD>`: Specify the password.

**Examples**

```
nx9500-6C8809(config-ex3500-management-policy-test)#username user1 access-level 5
nx9500-6C8809(config-ex3500-management-policy-test)#username user1 password 0 user1@1234
```

**Related Commands**

- `no`: Removes this SNMP user settings.
4.1.46.2.8  no

> ex3500-management-policy config commands

Removes or reverts this EX3500 management policy settings

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

Syntax

no [enable|http|memory|process-cpu|snmp-server|ssh|username]

no enable password {level <0-15>}

no http [port|secure-port|secure-sever|server]

no memory [falling-threshold|rising-threshold]

no process-cpu [falling-threshold|rising-threshold]

no snmp-server {community|contact|enable|engine-id|group|host|location|notify-filter|user|view}

no snmp-server {community <STRING>}

no snmp-server {contact}

no snmp-server {enable traps {authentication|link-up-down}}

no snmp-server {engine-id [local|remote <IP>]}  

no snmp-server {group <GROUP-NAME> [v1|v2c|v3 [auth|noauth|priv]]}

no snmp-server {host <IP>}

no snmp-server {location}

no snmp-server {notify-filter <WORD> remote <IP>}

no snmp-server {user <USER-NAME> [v1|v2c|v3]}

no snmp-server {user <USER-NAME> <GROUP-NAME> remote-host <IP> v3}

no snmp-server {view <VIEW-NAME> {<OID-TREE-STRING>}}

no ssh [authentication-retries|server|server-key size <512-1024>|timeout]

no username

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes this EX3500 management policy settings based on the parameters passed |
Examples

```
nx9500-6C8809(config-ex3500-management-policy-test)#show context
ex3500-management-policy test
  ssh server
  ssh authentication-retries 4
  ssh timeout 90
  ssh server-key size 600

http secure-server
  enable password level 3 7 12345678901020304050607080929291
  username user1 password 7 5c4786c1e52f913d38168ce89154a079

snmp-server enable traps authentication

snmp-server notify-filter 3 remote 1.2.3.4
  snmp-server notify-filter 1 remote 127.0.0.1
  snmp-server notify-filter 2 remote 192.168.13.10
  snmp-server host 1.2.3.4 inform timeout 1500 retry 2 test version 3 auth udp-port 180
  snmp-server host 192.168.13.10 snmp-teststring version 1 udp-port 170
  snmp-server engine-id local 1234567890

memory falling-threshold 50
memory rising-threshold 95

process-cpu falling-threshold 60

process-cpu rising-threshold 80
```

```
nx9500-6C8809(config-ex3500-management-policy-test)#no http secure-server

nx9500-6C8809(config-ex3500-management-policy-test)#no memory falling-threshold

nx9500-6C8809(config-ex3500-management-policy-test)#no process-cpu rising-threshold

nx9500-6C8809(config-ex3500-management-policy-test)#no snmp-server notify-filter 3 remote 1.2.3.4

nx9500-6C8809(config-ex3500-management-policy-test)#show context
```

```
ex3500-management-policy test
  ssh server
  ssh authentication-retries 4
  ssh timeout 90
  ssh server-key size 600
  enable password level 3 7 12345678901020304050607080929291
  username user1 password 7 5c4786c1e52f913d38168ce89154a079

snmp-server enable traps authentication

snmp-server notify-filter 1 remote 127.0.0.1
snmp-server notify-filter 2 remote 192.168.13.10
snmp-server host 1.2.3.4 inform timeout 1500 retry 2 test version 3 auth udp-port 180
snmp-server host 192.168.13.10 snmp-teststring version 1 udp-port 170
snmp-server engine-id local 1234567890
memory falling-threshold 50
memory rising-threshold 95
process-cpu falling-threshold 60
process-cpu rising-threshold 80
```

```
nx9500-6C8809(config-ex3500-management-policy-test)#
```
4.1.47 **ex3500-qos-class-map-policy**

*Global Configuration Commands*

The following table lists EX3500 QoS class map policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ex3500-qos-class-map-policy</strong></td>
<td>Creates an EX3500 QoS class map policy and enters its configuration mode</td>
<td>page 4-219</td>
</tr>
<tr>
<td><strong>ex3500-qos-class-map-policy config commands</strong></td>
<td>Summarizes EX3500 QoS class map policy configuration mode commands</td>
<td>page 4-220</td>
</tr>
<tr>
<td><strong>ex3500-qos-policy-map</strong></td>
<td>Creates an EX3500 QoS policy map and enters its configuration mode</td>
<td>page 4-226</td>
</tr>
<tr>
<td><strong>ex3500</strong></td>
<td>Creates an EX3500 time range list and enters its configuration mode</td>
<td>page 4-193</td>
</tr>
<tr>
<td><strong>ex3500-management-policy</strong></td>
<td>Creates an EX3500 management policy and enters its configuration mode</td>
<td>page 4-200</td>
</tr>
<tr>
<td><strong>ex3524</strong></td>
<td>Adds a EX3524 switch to the network</td>
<td>page 4-240</td>
</tr>
<tr>
<td><strong>ex3548</strong></td>
<td>Adds a EX3548 switch to the network</td>
<td>page 4-242</td>
</tr>
</tbody>
</table>
4.1.47.1 ex3500-qos-class-map-policy

Creates a EX3500 Quality of Service (QoS) class map policy and enters its configuration mode.

A QoS class map policy contains a set of Differentiated Services (DiffServ) classification criteria that are used to classify incoming traffic into different categories and provide differentiated service based on this classification. Each policy defines a set match criteria rules that use objects, such as access lists, IP precedence or DSCP values, and VLANs. When configured and applied, the policy classifies traffic based on layer 2, layer 3, or layer 4 information contained in each incoming packet.

Supported in the following platforms:

- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

Syntax

```
ex3500-qos-class-map-policy <POLICY-NAME>
```

Parameters

- `ex3500-qos-class-map-policy <POLICY-NAME>`

Examples

```
nx9500-6C8809(config)#ex3500-qos-class-map-policy dscp
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#?
```

EX3500_Qos_class_map Mode commands:

- `description` Class-map description
- `match` Defines the match criteria to classify traffic
- `no` Negate a command or set its defaults
- `rename` Redefines the name of class-map
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#
```

Related Commands

- `no` Removes an existing EX3500 QoS class map policy
4.1.47.2 ex3500-qos-class-map-policy config commands

The following table summarizes EX3500 QoS class map policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Configures a description for this EX3500 QoS class map policy</td>
<td>page 4-221</td>
</tr>
<tr>
<td>match</td>
<td>Configures match criteria rules used to classify traffic</td>
<td>page 4-222</td>
</tr>
<tr>
<td>rename</td>
<td>Renames an existing EX3500 QoS class map object</td>
<td>page 4-224</td>
</tr>
<tr>
<td>no</td>
<td>Removes this EX3500 QoS class map policy’s description and match criteria</td>
<td>page 4-225</td>
</tr>
</tbody>
</table>
### 4.1.47.2.1 description

> **ex3500-qos-class-map-policy config commands**

Configures this EX3500 QoS class map policy’s description

**Supported in the following platforms:**
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

description <LINE>

**Parameters**
- description <LINE>

| description <LINE> | Configures this EX3500 QoS class map policy’s description
|-------------------|-----------------------------------------------------------------------------------------------------------------
| • <LINE>          | – Enter a description that allows to you differentiate it from other policies with similar configuration (should not exceed 64 characters) |

**Examples**

nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#description "Matches packets marked for DSCP service 3"

nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#show context ex3500-qos-class-map-policy dscp

**Related Commands**

| no               | Removes this EX3500 QoS class map policy’s description |
4.1.47.2.2 match

- **ex3500-qos-class-map-policy config commands**

Configures match criteria rules used to classify traffic

Access lists, IP precedence, DSCP values, or VLANs are commonly used to classify traffic. Access lists select traffic based on layer 2, layer 3, or layer 4 information contained in each packet.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

```
match [access-list [ex3500-ext-access-list|ex3500-std-access-list|mac-acl] <ACL-NAME>|cos <0-7]|ip [dscp <0-63>|precedence <0-7>]|ipv6 dscp <0-63>|vlan <1-4094>]
```

**Parameters**

- **match [access-list [ex3500-ext-access-list|ex3500-std-access-list|mac-acl] <ACL-NAME>|cos <0-7]|ip [dscp <0-63>|precedence <0-7>]|ipv6 dscp <0-63>|vlan <1-4094>]**
  - **match** Configures the match criteria. The options are: access-list, cos, ip, ipv6, vlan
  - **Note:** Incoming packets matching the specified criteria are included in this QoS class map.

- **access-list [ex3500-ext-access-list|ex3500-std-access-list|mac-acl] <ACL-NAME>**
  - Uses access lists to provide the match criteria. You can use any one the following ACL types to classify traffic:
    - ex3500-ext-access-list – Uses an IPv4 EX3500 extended ACL
    - ex3500-std-access-list – Uses an IPv4 EX3500 standard ACL
    - mac-acl – Uses a MAC EX3500 ACL
  - The following keyword is common to all of the above ACL types:
    - `<ACL-NAME>` – Specify the ACL name (should be existing and configured).

- **cos <0-7>**
  - Configures the class of service (CoS) value used to apply user priority. CoS is a form of QoS applicable only to layer 2 Ethernet frames. It uses 3-bits (8 values) of the 802.1Q tag to differentiate and shape network traffic.
  - `<0-7>` – Specify the CoS value from 0 - 7.
  - Following are the 8 traffic classes based on the CoS value:
    - 000 (0) - Routine
    - 001 (1) - Priority
    - 010 (2) - Immediate
    - 011 (3) - Flash
    - 100 (4) - Flash Override
    - 101 (5) - Critical
    - 110 (6) - Internetwork Control
    - 111 (7) - Network Control

- **ip [dscp <0-63>|precedence <0-7>]**
  - Configures the IPv4 DSCP value to match and/or the IP precedence value to match.
  - `<0-63>` – Specify the DSCP value from 0 - 63. Use this option to specify the type of service (ToS) field values included in the IP header. The ToS field exists between the header length and the total length fields. The DSCP constitutes the first 6 bits of the ToS field.
  - **Contd...**
Usage Guidelines
When configuring match entries, take into consideration the following points:

- Deny rules included in an ACL (associated with a EX3500 QoS class map policy) are ignored whenever an incoming packet matches the ACL.
- A class map policy cannot include both IP ACL or IP precedence rule and a VLAN rule.
- A class map policy containing a MAC ACL or VLAN rule cannot include either an IP ACL or a IP precedence rule.
- A class map policy can include a maximum of 16 match entries.

Examples

```plaintext
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#match ip dscp 3
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#show context ex3500-qos-class-map-policy dscp
description "Matches packets marked for DSCP service 3"
match ip dscp 3
```

Related Commands

- `no`  Removes match criteria rules configured for this EX3500 QoS class map policy
4.1.47.2.3 rename

*ex3500-qos-class-map-policy config commands*

Renames an existing EX3500 QoS class map policy

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

`rename <EX3500-QOS-CLASS-MAP-POLICY-NAME> <NEW-EX3500-QOS-CLASS-MAP-POLICY-NAME>`

**Parameters**

- `rename <EX3500-QOS-CLASS-MAP-POLICY-NAME> <NEW-EX3500-QOS-CLASS-MAP-POLICY-NAME>`

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
</table>
| `rename <EX3500-QOS-CLASS-MAP-POLICY-NAME> <NEW-EX3500-QOS-CLASS-MAP-POLICY-NAME>` | Renames an existing EX3500 QoS class map  
| | • `<EX3500-QOS-CLASS-MAP-POLICY-NAME>` – Enter the EX3500 QoS class map’s current name.  
| | • `<NEW-EX3500-QOS-CLASS-MAP-POLICY-NAME>` – Enter the new name. |

**Examples**

```bash
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#rename [TAB]
dscp test test2
```

```bash
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#
```

```bash
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#rename test2 IP_Precedence
```

```bash
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#rename [TAB]
dscp IP_Precedence test
```

```bash
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#
```
4.1.47.2.4 no

**ex3500-qos-class-map-policy config commands**

Removes this EX3500 QoS class map policy’s description and match criteria

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

```markdown
no [description|match]
no description
no match [access-list [ex3500-ext-access-list|ex3500-std-access-list|mac-acl] <ACL-NAME>|cos <0-7>|ip [dscp <0-63>|precedence <0-7>]|ipv6 dscp <0-63>|vlan <1-4094>]
```

**Parameters**
- no <PARAMETERS>

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes the EX3500 QoS class map policy’s settings based on the parameters passed</th>
</tr>
</thead>
</table>

**Examples**

The following example shows the EX3500 QoS class map policy 'test' settings before the 'no' command are executed:

```plaintext
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#show context
ex3500-qos-class-map-policy dscp
  description "Matches packets marked for DSCP service 3"
  match ip dscp 3
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#
```

```plaintext
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#no description
```

```plaintext
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#no match ip dscp
```

The following example shows the EX3500 QoS class map policy 'test' settings after the 'no' command are executed:

```plaintext
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#show context
ex3500-qos-class-map-policy test
nx9500-6C8809(config-ex3500-qos-class-map-policy-dscp)#
```
The following table lists EX3500 QoS policy map configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ex3500-qos-policy-map</code></td>
<td>Creates a EX3500 policy map and enters its configuration mode</td>
<td>page 4-227</td>
</tr>
<tr>
<td><code>ex3500-qos-policy-map config commands</code></td>
<td>Summarizes EX3500 QoS policy map configuration mode commands</td>
<td>page 4-228</td>
</tr>
</tbody>
</table>
4.1.48.1 **ex3500-qos-policy-map**

*ex3500-qos-policy-map*

Creates an EX3500 policy map and enters its configuration mode.

An EX3500 policy map contains one or more EX3500 QoS class maps traffic classifications (existing and configured) and can be attached to multiple interfaces. Creates an EX3500 policy map, and then use the class parameter to configure policies for traffic that matches the criteria defined in the EX3500 QoS class map policy. For more information, see `match`.

**Supported in the following platforms:**
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

```
ex3500-qos-policy-map <EX3500-QOS-POLICY-MAP-NAME>
```

**Parameters**

- `ex3500-qos-policy-map <EX3500-QOS-POLICY-MAP-NAME>`

| `<EX3500-QOS-POLICY-MAP-NAME>` | Specify the EX3500 policy map's name |

**Examples**

```
nx9500-6C8809(config)#ex3500-qos-policy-map testPolicyMap
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap)#?
```

**EX3500_Qos_policy_map Mode commands:**

```
class        Defines a traffic classification for the policy
description  Policy-map description
no           Negate a command or set its defaults
clrscr       Clears the display screen
commit       Commit all changes made in this session
do           Run commands from Exec mode
end          End current mode and change to EXEC mode
exit         End current mode and down to previous mode
help         Description of the interactive help system
revert       Revert changes
service      Service Commands
show         Show running system information
write        Write running configuration to memory or terminal
```

```
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap)#
```

**Related Commands**

| **no** | Removes an existing EX3500 QoS policy map |

### 4.1.48.2 ex3500-qos-policy-map config commands

The following table summarizes EX3500 QoS policy map configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>class</td>
<td>Creates a policy map class and enters its configuration mode</td>
<td>page 4-229</td>
</tr>
<tr>
<td>description</td>
<td>Configures this EX3500 QoS policy map's description</td>
<td>page 4-238</td>
</tr>
<tr>
<td>no</td>
<td>Removes this EX3500 QoS policy map's settings. Use this keyword to remove or modify the description and to remove the QoS traffic classification created.</td>
<td>page 4-239</td>
</tr>
</tbody>
</table>
4.1.48.2.1 class

> ex3500-qos-policy-map config commands

Creates a policy map class and enters its configuration mode. The policy map class is a traffic classification upon which a policy can act.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

class <EX3500-QoS-CLASS-MAP-POLICY-NAME>

**Parameters**
- class <EX3500-QoS-CLASS-MAP-POLICY-NAME>

**Examples**

nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap)#class dscp
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#?
commands:
  no Negate a command or set its defaults
  police Defines a policer for classified traffic
  set Classify IP traffic

clearsc
  commit Commit all changes made in this session
  do Run commands from Exec mode
  end End current mode and change to EXEC mode
  exit End current mode and down to previous mode
  help Description of the interactive help system
  revert Revert changes
  show Show running system information
  write Write running configuration to memory or terminal

nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#

**Related Commands**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes this policy map class association</td>
</tr>
<tr>
<td>ex3500-qos-policy-map</td>
<td>EX3500 QoS policy map configuration mode commands</td>
</tr>
</tbody>
</table>
4.1.48.2.2 ex3500-qos-policy-map-class-config commands

The following table summarizes the policy map class configuration mode commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>police</td>
<td>Configures an enforcer for classified traffic</td>
<td>page 4-231</td>
</tr>
<tr>
<td>set</td>
<td>Sets class of service (CoS) value, per-hop behavior (PHB) value, and IP DSCP value in matching packets</td>
<td>page 4-235</td>
</tr>
<tr>
<td>no</td>
<td>Removes this traffic classification’s settings</td>
<td>page 4-237</td>
</tr>
</tbody>
</table>
4.148.2.3 police

Configures an enforcer for classified traffic

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

Syntax

police [flow|srtcm-color-aware|srtcm-color-blind|trtcm-color-aware|trtcm-color-blind]

police flow <0-1000000> <0-16000000> conform-action transmit violate-action [<0-63>|drop]

police [srtcm-color-aware|srtcm-color-blind] <0-1000000> <0-16000000> <0-16000000>
conform-action transmit exceed-action [<0-63>|drop] violate-action [<0-63>|drop]

Parameters
- police flow <0-1000000> <0-16000000> conform-action transmit violate-action [<0-63>|drop]

### Parameters

<table>
<thead>
<tr>
<th>police</th>
<th>Configures an enforcer for classified traffic</th>
</tr>
</thead>
</table>
| flow <0-1000000> <0-16000000> | Configures an enforcer for classified traffic based on the metered flow rate
- <0-1000000> – Configures the committed information rate (CIR) from 0 -1000000 kilobits per second.
- <0-16000000> – Configures the committed burst size (BC) from 0 - 16000000 bytes.

Policing is based on a token bucket, where bucket depth (i.e., the maximum burst before the bucket overflows) is specified by the committed-burst field, and the average rate tokens are added to the bucket is specified by the committed-rate option. Note that the token bucket functions similar to that described in RFC 2697 and RFC 2698.

The behavior of the meter is specified in terms of one token bucket (C), the rate at which the tokens are incremented CIR and the maximum size of the token bucket BC.

The token bucket C is initially full, that is, the token count Tc(0) = BC. Thereafter, the token count Tc is updated CIR times per second as follows:

- If Tc is less than BC, Tc is incremented by one, else
- Tc is not incremented.

When a packet of size B bytes arrives at time t, the following happens:

- If Tc(t)-B ≥ 0, the packet is green and Tc is decremented by B down to the minimum value of 0, else
- The packet is red and Tc is not decremented.

| conform-action transmit | Configures the action applied when packets fall within the specified CIR and BC limits
- transmit – Transmits packets falling within the specified CIR and BC limits. This is subject to there being enough tokens to service the packet, in which case the packet is set green.

| violate-action [<0-63>|drop] | Configures the action applied when packets violate the specified CIR and BC limits
- <0-63> – Applies a new DSCP value. Select the DSCP value from 0 - 63.
- drops – Drops packets violating the specified CIR and BC limits |
### police [srtcm-color-aware|srtcm-color-blind] <0-1000000> <0-16000000> <0-16000000> conform-action transmit exceed-action [<0-63>|drop] violate-action [<0-63>|drop]

<table>
<thead>
<tr>
<th>police</th>
<th>Configures an enforcer for classified traffic</th>
</tr>
</thead>
</table>
| [srtcm-color-aware|srtcm-color-blind] <0-1000000> | Configures an enforcer for classified traffic based on *single rate three color meter* (srTCM) mode. The srTCM as defined in RFC 2697 meters a traffic stream and processes its packets according to three traffic parameters — *Committed Information Rate* (CIR), *Committed Burst Size* (BC), and *Excess Burst Size* (BE).
| <0-16000000> | • srtc-color-blind - Single rate three color meter in color-blind mode
| <0-16000000> | • srtc-color-aware - Single rate three color meter in color-aware mode
| | The meter operates in one of two modes. In the color-blind mode, the meter assumes that the packet stream is uncolored. In color-aware mode the meter assumes that some preceding entity has pre-colored the incoming packet stream so that each packet is either green, yellow, or red. The marker (re)colors an IP packet according to the results of the meter. The color is coded in the DS field [RFC 2474] of the packet.
| | • <0-1000000> – Configures the CIR from 0 -1000000 kilobits per second.
| | • <0-16000000> – Configures the BC from 0 - 1600000 bytes.
| | • <0-16000000> – Configures the BE from 0 - 1600000 bytes.
| | The behavior of the meter is specified in terms of its mode and two token buckets, C and E, which both share the common rate CIR. The maximum size of the token bucket C is BC and the maximum size of the token bucket E is BE.
| | The token buckets C and E are initially full, that is, the token count Tc(0) = BC and the token count Te(0) = BE. Thereafter, the token counts Tc and Te are updated CIR times per second as follows:
| | • If Tc is less than BC, Tc is incremented by one, else
| | • If Te is less then BE, Te is incremented by one, else
| | • neither Tc nor Te is incremented.
| | When a packet of size B bytes arrives at time t, the following happens if srTCM is configured to operate in color-blind mode:
| | • If Tc(t)-B > OR = 0, the packet is green and Tc is decremented by B down to the minimum value of 0, else
| | • If Te(t)-B > OR = 0, the packets is yellow and Te is decremented by B down to the minimum value of 0,
| | • else the packet is red and neither Tc nor Te is decremented.
| | When a packet of size B bytes arrives at time t, the following happens if srTCM is configured to operate in color-aware mode:
| | • If the packet has been precolored as green and Tc(t)-B ? 0, the packet is green and Tc is decremented by B down to the minimum value of 0, else
| | • If the packet has been pre-colored as yellow or green and if
| | • Te(t)-B > OR = 0, the packets is yellow and Te is decremented by B down to the minimum value of 0, else the packet is red and neither Tc nor Te is decremented.
| | The metering policy guarantees a deterministic behavior where the volume of green packets is never smaller than what has been determined by the CIR and BC, that is, tokens of a given color are always spent on packets of that color. Refer to RFC 2697 for more information on other aspects of srTCM.
| conform-action transmit | Configures the action applied when packet rates fall within the specified CIR and BC limits
| | • transmit – Transmits packets falling within the specified CIR and BC limits
### police

*police [trtcm-color-aware|trtcm-color-blind] <0-1000000> <0-16000000> <0-1000000> <0-16000000> conform-action transmit exceed-action [<0-63>|drop]*

**police** Configures an enforcer for classified traffic

- **[trtcm-color-aware|trtcm-color-blind]** - Two rate three color meter in color-blind mode
- **<0-1000000>** - Configures the CIR from 0 - 1000000 kilobits per second
- **<0-16000000>** - Configures the BC from 0 - 1600000 bytes.
- **<0-1000000>** - Configures the PIR from 0 - 1000000 kilobits per second
- **<0-16000000>** - Configures the BP from 0 - 1600000 bytes

The meter operates in one of two modes. In the color-blind mode, the meter assumes that the packet stream is uncolored. In color-aware mode the meter assumes that some preceding entity has pre-colored the incoming packet stream so that each packet is either green, yellow, or red. The marker (re)colors an IP packet according to the results of the meter. The color is coded in the DS field [RFC 2474] of the packet.

The behavior of the meter is specified in terms of its mode and two token buckets, P and C, which are based on the rates PIR and CIR, respectively. The maximum size of the token bucket P is BP and the maximum size of the token bucket C is BC.

The token buckets P and C are initially (at time 0) full, that is, the token count Tp(0) = BP and the token count Tc(0) = BC. Thereafter, the token count Tp is incremented by one PIR times per second up to BP and the token count Tc is incremented by one CIR times per second up to BC.

When a packet of size B bytes arrives at time t, the following happens if trTCM is configured to operate in color-blind mode:

- If Tp(t)-B ≤ 0, the packet is red, else
- If Tc(t)-B ≤ 0, the packet is yellow and Tp is decremented by B, else
- The packet is green and both Tp and Tc are decremented by B.

Contd..
When a packet of size B bytes arrives at time t, the following happens if trTCM is configured to operate in color-aware mode:

- If the packet has been pre-colored as red or if TP(t) - B < 0, the packet is red, else
- If the packet has been pre-colored as yellow or if TC(t) - B < 0, the packet is yellow and TP is decremented by B, else
- The packet is green and both TP and TC are decremented by B.

The trTCM can be used to mark an IP packet stream in a service, where different, decreasing levels of assurances (either absolute or relative) are given to packets which are green, yellow, or red. Refer to RFC 2698 for more information on other aspects of trTCM.

| conform-action | Configures the action applied when packet rates fall within the specified CIR and BP limits
| transmit | transmit – Transmits packets falling within the specified CIR and BC limits
| exceed-action | Configures the action applied when packet rates exceed the specified CIR limit, but are within the specified PIR limit
| [<0-63>|drop] | <0-63> – Applies a new DSCP value. Select the DSCP value from 0 - 63. drops – Drops packets exceeding the specified CIR and BC limit
| violate-action | Configures the action applied when packet rates exceed the specified PIR limit
| [<0-63>|drop] | <0-63> – Applies a new DSCP value. Select the DSCP value from 0 - 63. drops – Drops packets exceeding the specified BE limit

Usage Guidelines
When configuring the traffic class enforcer parameters, take into consideration the following factors:

1. You can configure up to 200 enforcers/policers (i.e., class maps) for ingress ports.
2. The committed-rate cannot exceed the configured interface speed, and the committed-burst cannot exceed 16 Mbytes.

Examples
The following example uses the police trtcn-color-blind command to limit the average bandwidth to 100,000 Kbps, the committed burst rate to 4000 bytes, the peak information rate to 1,000,000 Kbps, the peak burst size to 6000, to remark any packets exceeding the committed burst size, and to drop any packets exceeding the peak information rate.

```
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#police trtcn-color-blind 100000 4000 100000 6000 conform-action transmit exceed-action 0 violate-action drop
```

```
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#show context class dscp
police trtcn-color-blind 100000 4000 100000 6000 conform-action transmit exceed-action 0 violate-action drop	nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#
```

Related Commands

```
no
```
Removes the traffic enforcer settings
4.1.48.2.4 set

Sets class of service (CoS) value, per-hop behavior (PHB) value, and IP DSCP value in matching packets

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

Syntax

```set [cos <0-7>|ip dscp <0-63>|phb <0-7>]
```

**Parameters**

- `set [cos <0-7>|ip dscp <0-63>|phb <0-7>]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>cos &lt;0-7&gt;</code></td>
<td>Configures the CoS value for a matching packet (as specified by the match command) in the packet's VLAN tag&lt;br&gt;• <code>&lt;0-7&gt;</code> – Specify a value from 0 - 7. The CoS is modified to the value specified here.</td>
</tr>
<tr>
<td><code>ip dscp &lt;0-63&gt;</code></td>
<td>Modifies the IP DSCP value in a matching packet (as specified by the match command)&lt;br&gt;• <code>&lt;0-63&gt;</code> – Specify a value from 0 - 63. The DSCP value is modified to the value specified here.</td>
</tr>
<tr>
<td><code>phb &lt;0-7&gt;</code></td>
<td>Configures a PHB value for a matching packets&lt;br&gt;• <code>&lt;0-7&gt;</code> – Specify a value from 0 - 7.&lt;br&gt;<strong>Note:</strong> The PHB label is composed of five bits, three bits for per-hop behavior, and two bits for the color scheme used to control queue congestion. A packet is marked green, yellow, or red as per the following:&lt;br&gt;• green if it does not exceed the CIR and BC limits&lt;br&gt;• yellow if it exceeds the CIR and BC limits, but not the BE limit, and&lt;br&gt;• red otherwise.</td>
</tr>
</tbody>
</table>

**Examples**

The following example uses the `set > phb` command to classify the service that incoming packets will receive, and then uses the `police > trtcм-color-blind` command to limit the average bandwidth to 100,000 Kbps, the committed burst rate to 4000 bytes, the peak information rate to 1,000,000 Kbps, the peak burst size to 6000 bytes, to remark any packets exceeding the committed burst size, and to drop any packets exceeding the peak information rate.

```bash
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-test2)#set phb 3
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-test2)#police trtcм-color-blind 100000 4000 1000000 6000 conform-action transmit exceed-action 0 violate-action drop
```

The following example uses the `set > ip dscp` command to classify the service that incoming packets will receive, and then uses the `police > flow` command to limit the average bandwidth to 100,000 Kbps, the burst rate to 4000 bytes, and configure the response to drop any violating packets:

```bash
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#set ip dscp 3
```
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#police
flow 100000 4000 conform-action transmit violate-action drop

nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#show context
  class dscp
  set ip dscp 3
  police flow 100000 4000 conform-action transmit violate-action drop
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes CoS value, PHB value, or IP DSCP value from this traffic class</td>
</tr>
</tbody>
</table>
4.1.48.25 no

*ex3500-qos-policy-map-class-config commands*

Removes this traffic classification’s settings

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

```
no [police|set]
no police [flow|srtcm-color-aware|srtcm-color-blind|trtcm-color-aware|
    trtcm-color-blind]
no set [cos|ip dscp|phb]
```

**Parameters**

- no <PARAMETERS>

**Examples**

```bash
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#show context
    class dscp
    set ip dscp 3
    police flow 100000 4000 conform-action transmit violate-action drop

nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#
```

```bash
nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#no set ip
dscp

nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#no police
flow

nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#show context
    class dscp

nx9500-6C8809(config-ex3500-qos-policy-map-testPolicyMap-pmap-class-dscp)#
```
### 4.1.48.2.6 description

- **ex3500-qos-policy-map config commands**

  Configures this EX3500 QoS policy map's description

  Supported in the following platforms:
  - Wireless Controller — RFS7000
  - Service Platforms — NX7500, NX9500

**Syntax**

description <LINE>

**Parameters**

- description <LINE>

<table>
<thead>
<tr>
<th>description &lt;LINE&gt;</th>
<th>Configures this EX3500 QoS policy map's description</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;LINE&gt; – Enter a description that allows to you differentiate it from other policies with similar configuration (should not exceed 64 characters)</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-ex3500-qos-policy-map-test)#description "This is a test EX3500 QoS Policy Map"
nx9500-6C8809(config-ex3500-qos-policy-map-test)#show context ex3500-qos-policy-map test  
description "This is a test EX3500 QoS Policy Map"  
class test  
nx9500-6C8809(config-ex3500-qos-policy-map-test)#
```

**Related Commands**

| no | Removes this EX3500 QoS policy map's description |
4.1.48.2.7 no

*ex3500-qos-policy-map config commands*

Removes this EX3500 QoS policy map's settings. Use this keyword to remove the description and to remove the QoS traffic classification created.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

no [class <EX3500-QoS-POLICY-MAP-NAME>|description]

**Parameters**
- no <PARAMETERS>

| no <PARAMETERS> | Removes this EX3500 QoS policy map's settings based on the parameters passed |

**Examples**

The following example shows the EX3500 QoS policy map 'test' settings before the 'no' command are executed:

```
x9500-6C8809(config-ex3500-qos-policy-map-test)#show context
ex3500-qos-policy-map test
description "This is a test EX3500 QoS Policy Map"
class test
```

nx9500-6C8809(config-ex3500-qos-policy-map-test)#

nx9500-6C8809(config-ex3500-qos-policy-map-test)#no description

nx9500-6C8809(config-ex3500-qos-policy-map-test)#no class test

The following example shows the EX3500 QoS policy map 'test' settings after the 'no' command are executed:

```
x9500-6C8809(config-ex3500-qos-policy-map-test)#show context
ex3500-qos-policy-map test
```

nx9500-6C8809(config-ex3500-qos-policy-map-test)#
4.1.49 ex3524

- **Global Configuration Commands**

  Adds a EX3524 switch to the network

  The EX3500 series switch is a Gigabit Ethernet layer 2 switch with either 24 or 48 10/100/1000-BASE-T ports, and four Small Form Factor Pluggable (SFP) transceiver slots for fiber connectivity.

  To enable layer 3 adoption of the logged EX3524 switch to a NOC controller, navigate to the EX3524 switch’s device configuration mode and execute the following command: `controller > host > <IP/HOSTNAME>`.

  EX3500 devices (EX3524 and EX3548) are layer 2 Gigabit Ethernet switches with either 24 or 48 10/100/1000-BASE-T ports, and four SFP transceiver slots for fiber connectivity. Each 10/100/1000 Mbps port supports both the IEEE 802.3af and IEEE 802.3at-2009 PoE standards. An EX3500 switch has an SNMP-based management agent that provides both in-band and out-of-band management access. The EX3500 switch utilizes an embedded HTTP Web agent and CLI, which in spite of being different from that of the WiNG operating system provides WiNG controllers PoE and port management resources.

  Going forward NX9500, NX7500, NX6500, NX4500 WiNG managed series service platforms and WiNG VMs can discover, adopt, and partially manage EX3500 series Ethernet switches without modifying the proprietary operating system running the EX3500 switches. The WiNG service platforms utilize standardized WiNG interfaces to push configuration files to the EX3500 switches, and maintain a translation layer, understood by the EX3500 switch, for statistics retrieval.

  Supported in the following platforms:
  - Wireless Controller — RFS7000
  - Service Platforms — NX7500, NX9500

**Syntax**

```
ex3524 <DEVICE-EX3524-MAC>
```

**Parameters**

- `<DEVICE-EX3524-MAC>` Specifies the MAC address of a EX3524 switch

**Examples**

```
nx9500-6C8809(config)#ex3524 A1-C4-33-6D-66-07

nx9500-6C8809(config-device-A1-C4-33-6D-66-07)#?
```

EX35xx Device Mode commands:

- `hostname` Set system's network name
- `interface` Select an interface to configure
- `ip` Internet Protocol (IP)
- `no` Negate a command or set its defaults
- `power` EX3500 Power over Ethernet Command
- `remove-override` Remove configuration item override from the device (so profile value takes effect)
- `upgrade` Configures upgrade option for ex3500 system
- `use` Set setting to use
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a EX3524 switch from the network</td>
</tr>
</tbody>
</table>
4.1.50 **ex3548**

**Global Configuration Commands**

Adds a EX3548 switch to the network

The EX3500 series switch is a Gigabit Ethernet layer 2 switch with either 24 or 48 10/100/1000-BASE-T ports, and four SFP transceiver slots for fiber connectivity.

Supported in the following platforms:
- Wireless Controller — RFS7000
- Service Platforms — NX7500, NX9500

**Syntax**

```plaintext
ex3548 <DEVICE-EX3548-MAC>
```

**Parameters**

- `ex3548 <DEVICE-EX3548-MAC>`

**Examples**

```plaintext
nx9500-6C8809(config)#ex3548 22-65-78-09-12-35
nx9500-6C8809(config-device-22-65-78-09-12-35)#?
```

**EX35xx Device Mode commands:**

- `hostname` Set system's network name
- `interface` Select an interface to configure
- `ip` Internet Protocol (IP)
- `no` Negate a command or set its defaults
- `power` EX3500 Power over Ethernet Command
- `remove-override` Remove configuration item override from the device (so profile value takes effect)
- `upgrade` Configures upgrade option for ex3500 system
- `use` Set setting to use
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```plaintext
nx9500-6C8809(config-device-22-65-78-09-12-35)#
```

**Related Commands**

| `no` | Removes a EX3548 switch from the network |
4.1.51 firewall-policy

Global Configuration Commands

Configures a firewall policy. This policy defines a set of rules for managing network traffic and prevents unauthorized access to the network behind the firewall.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`firewall-policy <FIREWALL-POLICY-NAME>`

Parameters

- `firewall-policy <FIREWALL-POLICY-NAME>`

<table>
<thead>
<tr>
<th>&lt;FIREWALL-POLICY-NAME&gt;</th>
<th>Specify the firewall policy name. If a firewall policy does not exist, it is created.</th>
</tr>
</thead>
</table>

Examples

```
rfs7000-37FABE(config)#firewall-policy test
rfs7000-37FABE(config-fw-policy-test)##
```

Firewall policy Mode commands:

- `acl-logging` Log on flow creating traffic
- `alg` Enable ALG
- `clamp` Clamp value
- `dhcp-offer-convert` Enable conversion of broadcast dhcp offers to unicast
- `dns-snoop` DNS Snooping
- `firewall` Wireless firewall
- `flow` Firewall flow
- `ip` Internet Protocol (IP)
- `ip-mac` Action based on ip-mac table
- `ipv6` Internet Protocol version 6 (IPv6)
- `ipv6-mac` Action based on ipv6-mac table
- `logging` Firewall enhanced logging
- `no` Negate a command or set its defaults
- `proxy-arp` Enable generation of ARP responses on behalf of another device
- `proxy-nd` Enable generation of ND responses (for IPv6) on behalf of another device
- `stateful-packet-inspection-l2` Enable stateful packet inspection in layer2 firewall
- `storm-control` Storm-control
- `virtual-defragmentation` Enable virtual defragmentation for IPv4 packets (recommended for proper functioning of firewall)

```
clrscr
```

Clears the display screen

```
commit
```

Commit all changes made in this session

```
do
```

Run commands from Exec mode

```
end
```

End current mode and change to EXEC mode

```
exit
```

End current mode and down to previous mode

```
help
```

Description of the interactive help system

```
revert
```

Revert changes

```
service
```

Service Commands

```
show
```

Show running system information

```
write
```

Write running configuration to memory or terminal

```
rfs7000-37FABE(config-fw-policy-test)##
```
**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes an existing firewall policy</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on Firewall policy, see *Chapter 13, FIREWALL-POLICY.*
4.1.52 global-association-list

Global Configuration Commands

Configures a global list of client MAC addresses. Based on the deny or permit rules specified, clients are either allowed or denied access to the managed network.

The global association list serves the same purpose as an Association Access Control List (ACL). However, the Association ACL allows a limited number of entries, a few thousand only, and does not suffice the requirements of a large deployment. This gap is filled by a global association list, which is much larger (with tens of thousands of entries). Both lists co-exist in the system. When an access request comes in, the association ACL is looked up first and if the requesting MAC address is listed in one of the deny ACLs, the association is denied. But, if the requesting client is permitted access, or if in case none of the ACLs list the client’s MAC address, the global association ACL is checked. Once authenticated, the client’s credentials are cached on the access point, and subsequent requests are not referenced to the controller. An entry in an APs credential cache means a pass in the global association list.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

global-association-list <GLOBAL-ASSOC-LIST-NAME>

Parameters

- global-association-list <GLOBAL-ASSOC-LIST-NAME>

| <GLOBAL-ASSOC-LIST-NAME> | Specify the global association list name. If a list with the same name does not exist, it is created.
| Note: Map this global association list to a device (controller) or a controller profile. Once associated, the controller applies this association list to requests received from all adopted APs. For more information, see use.
| Note: The global association list can also be mapped to a WLAN. The usage of global access lists is controlled on a per-WLAN basis. For more information, see association-list.

Examples

rfs4000-229D58(config)#global-association-list my-clients
rfs4000-229D58(config)#global-association-list my-clients#

Global Association List Mode commands:

default-action | Configure the default action when the client MAC does not match any rule
deny | Specify MAC addresses to be denied
no | Negate a command or set its defaults
permit | Specify MAC addresses to be permitted
clrscr | Clears the display screen
commit | Commit all changes made in this session
do | Run commands from Exec mode
end | End current mode and change to EXEC mode
exit | End current mode and down to previous mode
help | Description of the interactive help system
revert | Revert changes
service | Service Commands
show | Show running system information
write | Write running configuration to memory or terminal

rfs4000-229D58(config)#
rfs4000-229D58(config-global-assoc-list-my-clients)#permit 00-23-69-11-E6-C4
description "10th floor Lab1 Workstation1"

rfs4000-229D58(config-global-assoc-list-my-clients)#show context
global-association-list my-clients
  permit 00-23-69-11-E6-C4 description "10th floor Lab1 Workstation1"
rfs4000-229D58(config-global-assoc-list-my-clients)#

rfs4000-229D58(config)#show context

! Configuration of RFS4000 version 5.8.4.0-004D
!
version 2.5
!
client-identity TestClientIdentity
dhcp 1 message-type request option-codes exact hexstring 5e4d36780b3a7f
!
client-identity-group ClientIdentityGroup
  client-identity TestClientIdentity precedence 1
!
ip access-list BROADCAST-MULTICAST-CONTROL
  global-association-list my-clients
    permit 00-23-69-11-E6-C4 description "10th floor Lab1 Workstation1"
  !
  global-association-list test
    permit 11-22-33-44-55-66 description test
deny 22-33-44-55-66-77 description "Test Deny"
!
captive-portal test
--More--
rfs4000-229D58(config)#

rfs4000-229D58(config-device-00-23-68-22-9D-58)#use global-assoc-list server my-clients

rfs4000-229D58(config-device-00-23-68-22-9D-58)#show context

rfs4000 00-23-68-22-9D-58
use profile default-rfs4000
use rf-domain default
hostname rfs4000-229D58
license AP DEFAULT-6AP-LICENSE
license ADSEC DEFAULT-ADV-SEC-LICENSE
ip default-gateway 192.168.13.2
ip default-gateway priority static-route 20
interface ge1
  switchport mode access
interface vlan 1
  switchport access vlan 1
  ip address 192.168.13.9/24
  ip address 192.168.0.1/24 secondary
ip dhcp client request options all
use global-association-list server my-clients
use client-identity-group ClientIdentityGroup
logging on
logging console warnings
logging buffered warnings
rfs4000-229D58(config-device-00-23-68-22-9D-58)#
4.1.53 *guest-management*

*Global Configuration Commands*

The following table summarizes the guest management policy configuration mode commands:

**Table 4.31** Guest-Management Policy Config Command

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>guest-management</td>
<td>Creates a guest management policy and enters its configuration</td>
<td>page 4-248</td>
</tr>
<tr>
<td></td>
<td>mode</td>
<td></td>
</tr>
<tr>
<td>guest-management-policy-</td>
<td>Summarizes guest management policy configuration mode commands</td>
<td>page 4-249</td>
</tr>
<tr>
<td>policy-mode commands</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.1.53.1 guest-management

Configures a guest management policy that redirects guest users to a registration portal upon association to a captive portal SSID. Guest users are redirected to an internally (or) externally hosted registration page (registration.html) where previously, not-registered guest users can register. The internally hosted captive portal registration page can be customized based on business requirements. For more information, see webpage.

Use the guest management policy commands to configure parameters, such as E-mail host and SMS gateway along with the credentials required for sending pass code to guest via e-mail and SMS. You can configure up to 32 different guest management policies. Each guest management policy allows you to configure the SMS gateway, SMS message body, E-mail SMTP server, E-mail subject contents, and E-mail message body. Although, at any point-in-time, multiple guest management policies may exist, only one guest management policy can be active per device.

Guest registration is supported only on the NX9000 and NX7500 series service platforms as an adopting controller. But the number of user identity entries supported on each varies. It is 2 million and 1 million user identity entries for the NX9000 and NX7500 model service platforms respectively. Guest management and registration is not supported on any of the other WiNG supported platforms.

Supported in the following platforms:

- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

guest-management <POLICY-NAME>

**Parameters**

- guest-management <POLICY-NAME>

**Examples**

```
nx9500-6C8809(config)#guest-management guest
nx9500-6C8809(config-guest-management-guest)#?
```

Guest Management Mode commands:

- `email` Email guest-notification configuration
- `guest-database-backup` Configure guest-database-backup parameters
- `no` Negate a command or set its defaults
- `sms` SMS guest-notification configuration
- `sms-over-smtp` Sms-over-smtp configuration to email sms gateway address
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
nx9500-6C8809(config-guest-management-guest)#
```

**Related Commands**

- `no` Removes an existing guest management policy
4.1.53.2 guest-management-policy-mode commands

The following table summarizes guest management policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>email</td>
<td>Configures guest user e-mail notification settings</td>
<td>page 4-250</td>
</tr>
<tr>
<td>guest-database-backup</td>
<td>Enables periodic backup of the captive portal’s guest registration user database</td>
<td>page 4-252</td>
</tr>
<tr>
<td>sms</td>
<td>Configures guest user SMS notification settings</td>
<td>page 4-253</td>
</tr>
<tr>
<td>sms-over-smtp</td>
<td>Configures an e-mail host server (for example: smtp.gmail.com) along with sender related credentials and the recipient gateway e-mail address to which the message is E-mailed. The gateway server converts the e-mail into SMS and sends the message to the guest users’s mobile device</td>
<td>page 4-255</td>
</tr>
<tr>
<td>no</td>
<td>Removes this guest management policy settings</td>
<td>page 4-257</td>
</tr>
</tbody>
</table>
### email

**guest-management-policy-mode commands**

Configures guest user e-mail notification settings

Guest users can register themselves with their e-mail credentials as a primary key for authentication. The captive portal system provides the pass code for their registration. Guest users need to use their registered e-mail, mobile, or member ID and the received pass code for further login to the captive portal.

Supported in the following platforms:

- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
email [host|message|subject]

email host [<IP/HOSTNAME>|<HOST-ALIAS-NAME>] sender <EMAIL-ADDRESS>
  security [none|ssl|starttls] username <USER-NAME> password <PASSWORD>

email message <LINE>

email subject <LINE>
```

**Parameters**

- **email host [<IP/HOSTNAME>|<HOST-ALIAS-NAME>]**
  - `sender <EMAIL-ADDRESS>`
    - Configures the SMTP server resource’s IPv4 address or hostname used for guest management email traffic, guest user credential validation, and pass code reception. Optionally you can use an existing host alias to identify the SMTP server resource.
    - `<IP/HOSTNAME>` – Specify the SMTP server resource’s IP address or hostname.
    - `<HOST-ALIAS-NAME>` – Specify the host alias name (should be existing and configured). Consider providing the host as an alias. A host alias is a configuration item that maps the alias to a hostname. Once created, it can be used across different configuration modes. Where ever used the alias is replaced by the associated hostname.

- **sender <EMAIL-ADDRESS>**
  - Configures the sender’s e-mail address. The sender here is the guest user receiving the pass code. Guest users require this pass code for registering their guest e-mail credentials.
    - `<EMAIL-ADDRESS>` – Specify the e-mail address (should not exceed 100 characters).

- **security [none|ssl|starttls]**
  - Configures the encryption protocol used by the SMTP server when communicating the pass code
    - `none` – No encryption used. Use if no additional user authentication is needed beyond the required username and password combination.
    - `SSL` – Uses SSL encryption. This is the default setting.
    - `STARTTLS` – Uses STARTTLS encryption

- **username <USER-NAME>**
  - Configures a username unique to this SMS guest management configuration. After configuring the username, specify the associated password. Ensure that the password is correctly provided to receive the pass code required for registering guest user credentials with SMS.
    - `<USER-NAME>` – Specify the username (should not exceed 100 characters).

- **password <PASSWORD>**
  - Configures the password associated with the specified SMTP user name
    - `<PASSWORD>` – Specify the password (should not exceed 63 characters).
### email message <LINE>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>email</td>
<td>Configures guest user e-mail notification content</td>
</tr>
<tr>
<td>message &lt;LINE&gt;</td>
<td>Configures the content of the e-mail sent to the guest user notifying the pass code (should not exceed 1024 characters)</td>
</tr>
<tr>
<td></td>
<td>•  &lt;LINE&gt; – Specify the message content. When entering the message, use the following tags:</td>
</tr>
<tr>
<td></td>
<td>GM-NAMESPACE – for the guest user’s name</td>
</tr>
<tr>
<td></td>
<td>GM_PASSCODE – for the pass code</td>
</tr>
<tr>
<td></td>
<td>CR-NL – to enter a new line</td>
</tr>
<tr>
<td></td>
<td>For example: Dear GM_NAME, CR-NL your internet access pass code is GM_PASSCODE. CR-NL Use this for internet access.</td>
</tr>
</tbody>
</table>

### email subject <LINE>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>email</td>
<td>Configures guest user e-mail notification subject line</td>
</tr>
<tr>
<td>subject &lt;LINE&gt;</td>
<td>Configures the subject line of the e-mail sent to the guest user notifying the pass code (should not exceed 100 characters)</td>
</tr>
<tr>
<td></td>
<td>•  &lt;LINE&gt; – Specify the subject line content. When entering the subject line, use the following tag:</td>
</tr>
<tr>
<td></td>
<td>GM-NAMESPACE – for the guest user’s name</td>
</tr>
<tr>
<td></td>
<td>For example: GM_NAME, your internet access code</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-guest-management-test)#email host 192.168.13.10 sender bob@zebra.com security ssl username guest1 password guest1@123

nx9500-6C8809(config-guest-management-test)#show context
guest-management test
   email host 192.168.13.10 sender bob@zebra.com security ssl username guest1 password guest1@123

nx9500-6C8809(config-guest-management-test2)#

nx9500-6C8809(config-guest-management-test2)#email message Dear GM_Guest2, CR-NL Your internet access passcode is GM_Guest2. CR-NL Use this for internet access.

nx9500-6C8809(config-guest-management-test2)#email subject GM_Guest2 Your internet access code

nx9500-6C8809(config-guest-management-test2)#show context
guest-management test2
   email subject GM_Guest2 Your internet access code
   email message Dear GM_Guest2, CR-NL Your internet access passcode is GM_Guest2. CR-NL Use this for internet access.

nx9500-6C8809(config-guest-management-test2)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the e-mail settings used to send notification mails to the guest user</td>
</tr>
</tbody>
</table>
### 4.1.53.2.2 guest-database-backup

- **guest-management-policy-mode commands**

Enables periodic backup of a captive portal’s guest registration user database. This option is enabled by default.

Supported in the following platforms:
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
guest-database-backup enable {<TIME>}
```

**Parameters**

- `guest-database-backup enable {<TIME>}`

<table>
<thead>
<tr>
<th>guest-database-backup enable &lt;TIME&gt;</th>
<th>Enables periodic backup of a captive portal’s guest registration user database. This command also allows you to configure the time at which the system starts backing up the database. The default backup-start time is ‘00:00’ (midnight every day).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;TIME&gt; – Optional. Resets the periodic database backup-start time to a user-defined value in the HH;MM format. When specified, the system starts periodic backup of the database, every day, at the specified time.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-guest-management-test)#guest-database-backup enable 12:30
vnx9500-6C8809(config-guest-management-test)#show context
  guest-management test
  guest-database-backup enable 12:30
  nx9500-6C8809(config-guest-management-test)#
```

**Related Commands**

| no | Disables periodic backup of a captive portal’s guest registration user database |
4.1.53.2.3 sms

*guest-management-policy-mode commands*

Configures guest user SMS notification settings

SMS enables guest users to register themselves with their e-mail or mobile device ID as the primary key for authentication. The captive portal provides the pass code for registration. Guest users use their registered e-mail or mobile device ID and the received pass code for future login to the captive portal.

**NOTE:** When using SMS, ensure that the WLAN’s mode of authentication is set to *none* and the mode of registration is set to *user*. In other words, captive portal authentication must always enforce guest registration.

SMS is similar to MAC address-based self registration, but in addition the captive portal sends an SMS message, containing an access code, to the user’s mobile phone number provided at the time of registration. The captive portal verifies the code, returns the *Welcome* page and provides access. This allows the administrator to verify the phone number provided and can be traced back to a specific individual should the need arise.

The default gateway used with SMS is *Clickatell*. A pass code can be sent with SMS to the guest user directly using Clickatell, or the pass code can be sent via e-mail to the SMS Clickatell gateway server, and Clickatell sends the pass code SMS to the guest user.

Supported in the following platforms:

- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
sms [host|message]

sms host clickatell username <USER-NAME> password <PASSWORD> api-id <ID> 
  user-agent <PYCLICKATELL> {source-number <WORD>}

sms message <LINE>
```

**Parameters**

- `sms host clickatell username <USER-NAME> password <PASSWORD> api-id <ID> user-agent <PYCLICKATELL> {source-number <WORD>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sms</td>
<td>Configures guest user SMS notification settings</td>
</tr>
<tr>
<td>host clickatell</td>
<td>By default, <em>clickatell</em> is the host SMS gateway server resource. Upon receiving the pass code e-mail, the SMS gateway sends the actual notification pass code SMS to the guest user.</td>
</tr>
<tr>
<td>username &lt;USER-NAME&gt;</td>
<td>Configures a username unique to this SMS guest management configuration. After configuring the username, specify the associated password. Ensure that the password is correctly provided to receive the pass code required for registering guest user credentials with SMS.</td>
</tr>
<tr>
<td>password &lt;PASSWORD&gt;</td>
<td>Configures the password associated with the specified username</td>
</tr>
<tr>
<td>api-id &lt;ID&gt;</td>
<td>Set a 32 character maximum API ID</td>
</tr>
<tr>
<td>user-agent &lt;PYCLICKATELL&gt;</td>
<td>Since the SMS service provider by default is Clickatell, set the user agent name to <em>pyclickatell</em>. The user-agent value ensures the Clickatell SMS gateway server and its related credentials, needed for sending the pass code to guest users, are configured.</td>
</tr>
</tbody>
</table>
### source-number <WORD>
Optional. Configures the long-address or the from-number associated with this Clickatell user account
- <WORD> – Specify the source number (should not exceed 32 characters).

---

### sms message <LINE>

**Examples**

nx9500-6C8809(config-guest-management-test)#sms host clickatell username guest1 password guest1@123 api-id test user-agent pyclickatell

nx9500-6C8809(config-guest-management-test)#sms message Dear guest1, Your passcode for internet access is GM-guest1

nx9500-6C8809(config-guest-management-test)#show context
guest-management test
  email host 192.168.13.10 sender bob@zebra.com security ssl username guest1 password guest1@123
  sms host clickatell username guest1 password guest1@123 api-id test user-agent pyclickatell
  sms message Dear guest1, Your passcode for internet access is GM-guest1

**Related Commands**

**no** Removes the SMS settings used to send SMS to the guest user

- **SMS** Configures guest user SMS notification content
  - **message <LINE>** Configures the content of the SMS sent to the guest user notifying the pass code (should not exceed 1024 characters)
    - <LINE> – Specify the message content. When entering the message, use the following tags:
      - GM-NAME – for the guest user’s name
      - GM_PASSCODE – for the pass code
      - For example: Dear GM_NAME, your internet access pass code is GM_PASSCODE.
4.1.53.2.4 sms-over-smtp

Configures an e-mail host server (for example: smtp.gmail.com) along with sender related credentials and the recipient gateway e-mail address to which the message is E-mailed. The gateway server converts the e-mail into SMS and sends the message to the guest users’s mobile device.

When sending an e-mail, the e-mail client interacts with a SMTP server to handle the content transmission. The SMTP server on the host may have conversations with other SMTP servers to deliver the e-mail.

Supported in the following platforms:
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
sms-over-smtp [host|message|subject]
sms-over-smtp  host [<IP/HOSTNAME>|<HOST-ALIAS-NAME>] sender <EMAIL-ADDRESS>
  security [none|ssl|starttls] username <USER-NAME> password <PASSWORD> recipient <EMAIL-ADDRESS>
sms-over-smtp  message <LINE>
sms-over-smtp  subject <LINE>
```

Parameters

- `sms-over-smtp host [<IP/HOSTNAME>|<HOST-ALIAS-NAME>]` sender `<EMAIL-ADDRESS>`
  - Configures the SMS gateway server resource’s IPv4 address or hostname used for guest management SMS over SMTP traffic, guest user credential validation and pass code reception. Optionally you can use an existing host alias to identify the SMS gateway server resource.
  - `<IP/HOSTNAME>` – Specify the SMTP gateway server resource’s IP address or hostname.
  - `<HOST-ALIAS-NAME>` – Specify the host alias name (should existing and configured). Consider providing the host as an alias. A host alias is a configuration item that maps the alias to a hostname. Once created, it can be used across different configuration modes. Where ever used the alias is replaced by the associated hostname.

- `sender `<EMAIL-ADDRESS>`
  - Configures the sender’s e-mail address. The sender here is the guest user receiving the pass code. Guest users require this pass code for registering their guest e-mail credentials using SMTP.
  - `<EMAIL-ADDRESS>` – Specify the e-mail address (should not exceed 64 characters).

- `security [none|ssl|starttls] username <USER-NAME> password <PASSWORD> recipient <EMAIL-ADDRESS>`
  - Configures the encryption protocol used by the SMTP server when communicating the pass code
  - `none` – No encryption used. Use if no additional user authentication is needed beyond the required username and password combination.
  - `SSL` – Uses SSL encryption. This is the default setting.
  - `STARTTLS` – Uses STARTTLS encryption
### username

**<USER-NAME>**

Configures a username unique to this SMTP guest management configuration. After configuring the username, specify the associated password. Ensure that the correct password is provided to receive the pass code required for registering guest user credentials with SMTP.

- `<USER-NAME>` – Specify the username (should not exceed 64 characters).

### password

**<PASSWORD>**

Configures the password associated with the specified SMTP user name.

- `<PASSWORD>` – Specify the password (should not exceed 64 characters).

### recipient

**<EMAIL-ADDRESS>**

Configures the e-mail recipient's e-mail address.

- `<EMAIL-ADDRESS>` – Specify the recipient's e-mail address (should not exceed 64 characters in length).

### sms-over-smtp message

**<LINE>**

Configures guest user SMS over SMTP notification message content

- `<LINE>` – Specify the message content. When entering the message, use the following tags:
  - GM-NAME – for the guest user's name
  - GM_PASSCODE – for the pass code
  - CR-NL – to enter a new line
  - For example: Dear GM_NAME, your internet access pass code is GM_PASSCODE. CR-NL Use this access code for internet access.

### sms-over-smtp subject

**<LINE>**

Configures guest user e-mail notification subject line content

- `<LINE>` – Specify the subject line content. When entering the subject line, use the following tag:
  - GM-NAME – for the guest user's name
  - For example: GM_NAME, your internet access code

### Examples

nx9500-6C8809(config-guest-management-test3)#sms-over-smtp host test sender bob@zebra.com security ssl username bob password bob@123 recipient bob@zebra.com

nx9500-6C8809(config-guest-management-test3)#show context guest-management test3
  sms-over-smtp host test sender bob@zebra.com security ssl username bob password bob@123 recipient bob@zebra.com

nx9500-6C8809(config-guest-management-test3)#

### Related Commands

no

Removes the SMS over SMTP settings used to send SMS to the guest user.
4.1.53.2.5 no

> guest-management-policy-mode commands

Removes this guest management policy settings

Supported in the following platforms:

- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [email|guest-database-backup|sms|sms-over-smtp]

no email [host|message|subject]

no guest-database-backup enable

no sms [host|message]

no sms-over-smtp [host|message|subject]

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes this guest management policy settings based on the parameters passed |

Examples

nx9500-6C8809(config-guest-management-test3)#show context
  guest-management test3
    sms-over-smtp host test sender bob@zebra.com security ssl username bob password bob@123
    recipient bob@zebra.com

nx9500-6C8809(config-guest-management-test3)#

nx9500-6C8809(config-guest-management-test3)#no sms-over-smtp host

nx9500-6C8809(config-guest-management-test3)#show context
  guest-management test3

nx9500-6C8809(config-guest-management-test3)#
4.1.54 host

- **Global Configuration Commands**

Enters the configuration context of a remote device using its hostname

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
host <DEVICE-NAME>
```

**Parameters**

- `host <DEVICE-NAME>`

<table>
<thead>
<tr>
<th>&lt;DEVICE-NAME&gt;</th>
<th>Specify the device’s hostname. All discovered devices are displayed when ‘Tab’ is pressed to auto complete this command.</th>
</tr>
</thead>
</table>

**Examples**

```
rf4000-229D58 (config)#host rf4000-229D58
rf4000-229D58 (config-device-00-23-68-22-9D-58)#
```
4.1.55 **inline-password-encryption**

*Global Configuration Commands*

Stores the encryption key in the startup configuration file.

By default, the encryption key is not stored in the startup-config file. Use the `inline-password-encryption` command to move the encrypted key to the startup-config file. This command uses the master key to encrypt the password, then moves it to the startup-config file.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
inline-password-encryption
```

**Parameters**

None

**Usage Guidelines**

When the configuration file is imported to a different device, it first decrypts the encryption key using the default key and then decrypts the rest of the configuration using the administrator configured encryption key.

**Examples**

```plaintext
rfs7000-37FABE(config)#password-encryption secret 2 12345678
```

```plaintext
rfs7000-37FABE(config)#commit write memory
```

This command uses the specified password for encryption key and stores it outside of startup-config.

```plaintext
rfs7000-37FABE(config)#inline-password-encryption
```

This command moves the same password to the startup-config and encrypts it with the master key.

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables storing of the encryption key in the startup configuration file</td>
</tr>
<tr>
<td>password-encryption</td>
<td>Enables password encryption</td>
</tr>
</tbody>
</table>
4.1.56 ip

**Global Configuration Commands**

Creates a IP access control list (ACL) and/or a SNMP IP ACL

Access lists define access permissions to the network using a set of rules. Each rule specifies an action taken when a packet matches the rule. If the action is deny, the packet is dropped. If the action is permit, the packet is allowed.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ip [access-list|snmp-access-list]
ip access-list <IP-ACL-NAME>
ip snmp-access-list <IP-SNMP-ACL-NAME>
```

**Parameters**

- **ip access-list <IP-ACL-NAME>**
  - **access-list**
    - <IP-ACL-NAME> — Creates an IP ACL and enters its configuration mode
      - <IP-ACL-NAME> — Specify the ACL name. If the access list does not exist, it is created.

- **ip snmp-access-list <IP-SNMP-ACL-NAME>**
  - **snmp-access-list**
    - <IP-SNMP-ACL-NAME> — Creates a SNMP IP ACL and enters its configuration mode. An SNMP IP ACL is an access control mechanism that uses a combination of IP ACL and SNMP community string.
      - SNMP performs network management functions using a data structure called a *Management Information Base* (MIB). SNMP is widely implemented but not very secure, since it uses only text community strings for accessing controller or service platform configuration files.
      - Use SNMP ACLs (firewalls) to help reduce SNMP’s vulnerabilities, as SNMP traffic can be easily exploited to produce a *denial of service* (DoS).
        - <IP-SNMP-ACL-NAME> — Specify the SNMP IP ACL name. If the access list does not exist, it is created. After creating the SNMP ACL, define the deny/permit rules based on the network and/or host IP addresses. Once created and configured, link this SNMP IP ACL with a SNMP community string.
          - **Note:** To link the SNMP community string with the SNMP IP ACL, in the management-policy-config-mode, use the following command: `snmp-server > community <COMMUNITY-STRING> > [ro|rw] > ip-snmp-access-list <IP-SNMP-ACL-NAME>`. 

Examples
rfs7000-37FABE(config)#ip access-list test
rfs7000-37FABE(config-ip-acl-test)#?

ACL Configuration commands:
 deny     Specify packets to reject
 disable  Disable rule if not needed
 no       Negate a command or set its defaults
 permit   Specify packets to forward
 clrscr   Clears the display screen
 commit   Commit all changes made in this session
 end      End current mode and change to EXEC mode
 exit     End current mode and down to previous mode
 help     Description of the interactive help system
 revert   Revert changes
 service  Service Commands
 show     Show running system information
 write    Write running configuration to memory or terminal

rfs7000-37FABE(config-ip-acl-test)#

rfs7000-37FABE(config)#ip snmp-access-list SNMPAcl
rfs7000-37FABE(config-ip-snmp-acl-SNMPAcl)#?

SNMP ACL Configuration commands:
 deny     Specify packets to reject
 no       Negate a command or set its defaults
 permit   Specify packets to forward
 clrscr   Clears the display screen
 commit   Commit all changes made in this session
 do       Run commands from Exec mode
 end      End current mode and change to EXEC mode
 exit     End current mode and down to previous mode
 help     Description of the interactive help system
 revert   Revert changes
 service  Service Commands
 show     Show running system information
 write    Write running configuration to memory or terminal

rfs7000-37FABE(config-ip-snmp-acl-SNMPAcl)#

Related Commands

no Removes an IP access control list

NOTE: For more information on access control lists, see Chapter 11, ACCESS-LIST.
### Global Configuration Commands

Creates an IPv6 ACL

An IPv6 ACL defines a set of rules that filter IPv6 packets flowing through a port or interface. Each rule specifies the action taken when a packet matches the rule. If the action is deny, the packet is dropped. If the action is permit, the packet is allowed.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
ipv6 access-list <IPv6-ACL-NAME>
```  

#### Parameters

- `ipv6 access-list <IPv6-ACL-NAME>`

#### Examples

```
rfs4000-229D58(config)#ipv6 access-list IPv6ACLTest
rfs4000-229D58(config-ipv6-acl-IPv6ACLTest)#?
```

IPv6 Access Control Mode commands:

- `deny` Specify packets to reject
- `no` Negate a command or set its defaults
- `permit` Specify packets to forward
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
rfs4000-229D58(config-ipv6-acl-IPv6ACLTest)#
```

#### Related Commands

| `no` | Removes an IPv6 access control list |

---

**NOTE:** For more information on access control lists, see *Chapter 11, ACCESS-LIST.*
4.1.58 ipv6-router-advertisement-policy

The following table lists the IPv6 router advertisement (RA) policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipv6-router-advertisement-policy</td>
<td>Creates a new IPv6 RA policy and enters its configuration mode</td>
<td>page 4-264</td>
</tr>
<tr>
<td>ipv6-router-advertisement-policy-mode commands</td>
<td>Summarizes the IPv6 RA policy configuration mode commands</td>
<td>page 4-266</td>
</tr>
</tbody>
</table>
4.1.58.1 ipv6-router-advertisement-policy

- ipv6-router-advertisement-policy

Creates an IPv6 RA policy and enters its configuration mode.

An IPv6 router policy allows routers to advertise their presence in response to solicitation messages. After receiving a neighbor solicitation message, the destination node sends an advertisement message, which includes the link layer address of the source node. After receiving the advertisement, the destination device replies with a neighbor advertisement message on the local link. After the source receives the advertisement it can communicate with other devices.

Advertisement messages are also sent to indicate a change in link layer address for a node on the local link. With such a change, the multicast address becomes the destination address for advertisement messages.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ipv6-router-advertisement-policy <POLICY-NAME>

Parameters

- ipv6-router-advertisement-policy <POLICY-NAME>

Examples

rfs4000-229D58(config)#ipv6-router-advertisement-policy test
rfs4000-229D58(config-ipv6-radv-policy-test)#?

IPv6 Router Advertisement Policy Mode commands:

- advertise: Option to advertise in router advertisement
- assist-neighbor-discovery: Send the Source Link Layer address option in Router Advertisement to assist in neighbor discovery
- check-ra-consistency: Check if the parameters advertised by other routers on the link are in conflict with those configured on this router. Conflicts are logged.
- dns-server: DNS Server
- domain-name: Configure domain-name
- managed-config-flag: Set the managed-address-configuration flag in Router Advertisements. When set, it indicates that the addresses are available via DHCPv6
- nd-reachable-time: Time that a node assumes a neighbor is reachable after having received a reachability confirmation
- no: Negate a command or set its defaults
- ns-interval: Time between retransmitted Neighbor Solicitation messages
- other-config-flag: Set the other-configuration flag in Router Advertisements. When set, it indicates that other configuration information is available via DHCPv6.
- ra: Router Advertisements
- router-lifetime: Lifetime associated with the default router
- route-preference: Preference of this router over other routers
- unicast-solicited-advertisement: Unicast the solicited Router Advertisements
clrscr                  Clears the display screen
commit                 Commit all changes made in this session
do                     Run commands from Exec mode
end                     End current mode and change to EXEC mode
exit                    End current mode and down to previous mode
help                    Description of the interactive help system
revert                  Revert changes
service                 Service Commands
show                    Show running system information
write                   Write running configuration to memory or terminal

rfs4000-229D58(config-ipv6-radv-policy-test)＃

<table>
<thead>
<tr>
<th>Related Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
</tr>
</tbody>
</table>
### 4.1.58.2 ipv6-router-advertisement-policy-mode commands

#### ipv6-router-advertisement-policy

The following table summarizes IPv6 router advertisement policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>advertise</td>
<td>Enables advertisement of IPv6 <em>maximum transmission unit</em> (MTU) and hop-count value in RAs</td>
<td>page 4-267</td>
</tr>
<tr>
<td>assist-neighbor-discovery</td>
<td>Enables advertisement of the source link layer address in RAs</td>
<td>page 4-268</td>
</tr>
<tr>
<td>check-ra-consistency</td>
<td>Enables checking of consistency in RA values advertised by this router with those advertised by other routers, if any, on the same link</td>
<td>page 4-269</td>
</tr>
<tr>
<td>dns-server</td>
<td>Configures the DNS server’s IPv6 address and lifetime advertised in RAs</td>
<td>page 4-270</td>
</tr>
<tr>
<td>domain-name</td>
<td>Configures the Domain name search label advertised in RAs</td>
<td>page 4-271</td>
</tr>
<tr>
<td>managed-config-flag</td>
<td>Sets the managed address configuration flag in RAs</td>
<td>page 4-272</td>
</tr>
<tr>
<td>nd-reachable-time</td>
<td>Enables advertisement of neighbor reachable time in RAs</td>
<td>page 4-273</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts router advertisement policy settings</td>
<td>page 4-274</td>
</tr>
<tr>
<td>ns-interval</td>
<td>Configures the interval between two successive retransmitted <em>neighbor solicitation</em> (NS) messages</td>
<td>page 4-275</td>
</tr>
<tr>
<td>other-config-flag</td>
<td>Sets the other-configuration flag in RAs</td>
<td>page 4-276</td>
</tr>
<tr>
<td>ra</td>
<td>Configures RA related parameters, such as the interval between two unsolicited successive RAs</td>
<td>page 4-277</td>
</tr>
<tr>
<td>router-lifetime</td>
<td>Configures the default router’s lifetime, in seconds, advertised in RAs</td>
<td>page 4-278</td>
</tr>
<tr>
<td>router-preference</td>
<td>Configures the router preference field value advertised in RAs</td>
<td>page 4-279</td>
</tr>
<tr>
<td>unicast-solicited-advertisement</td>
<td>Enables unicasting of solicited RAs</td>
<td>page 4-280</td>
</tr>
</tbody>
</table>

*Table 4.34 IPv6-Router-Advertisement-Policy-Config-Mode Commands*
4.1.58.2.1 advertise

IPv6-router-advertisement-policy-mode commands

Enables advertisement of IPv6 MTU and hop-count value in RAs

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

advertise [hop-limit|mtu]

Parameters

- advertise [hop-limit|mtu]

| advertise [hop-limit|mtu] | Enables advertisement of IPv6 MTU and hop-count value in RAs. Both these features are disabled by default. |
|-------------------------|--------------------------------------------------------------------------------------------------|

Examples

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#advertise hop-limit

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#advertise mtu

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context
ipv6-router-advertisement-policy test
advertisemt
advertise hop-limit
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#

Related Commands

- no | Disables advertisement of IPv6 MTU and hop-count value in RAs |
4.1.58.2.2 assist-neighbor-discovery

- **ipv6-router-advertisement-policy-mode commands**

  Enables advertisement of the source link layer address in RAs to facilitate neighbor discovery. This feature is enabled by default.

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
assist-neighbor-discovery
```

**Parameters**

None

**Examples**

```
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#assist-neighbor-discovery
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables the advertisement of the source link layer address in RAs</td>
</tr>
</tbody>
</table>
4.1.58.2.3 check-ra-consistency

Enables checking of consistency in RA values advertised by this router with those advertised by other routers, if any, on the same link. If the values advertised are inconsistent, a conflict is logged.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
check-ra-consistency

Parameters
None

Examples
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#check-ra-consistency
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy test
   advertise mtu
   advertise hop-limit
   check-ra-consistency
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#

Related Commands

| no | Enables comparison of interface-specific parameters advertised by other routers, within the link, with those advertised with this router |
4.1.58.2.4 dns-server

ipv6-router-advertisement-policy-mode commands

Configures the DNS server’s IPv6 address and lifetime. The configured values are advertised in RAs.

Supported in the following platforms:
• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dns-server <IPv6> {lifetime [<4-3600>|expired|infinite]}

Parameters
• dns-server <IPv6> {lifetime [<4-3600>|expired|infinite]}

| dns-server <IPv6> | Configures the DNS server’s IPv6 address
| lifetime [<4-3600>|expired|infinite] | Enables the use of a DNS server to resolve host names to IPv6 addresses. When an IPv6 host is configured with the address of a DNS server, the host sends DNS name queries to the server for resolution.
| lifetime [<4-3600>|expired|infinite] | • <IPv6> – Specify the DNS server’s address. This address is advertised in RAs. A maximum of four (4) entries can be made per policy.
| lifetime [<4-3600>|expired|infinite] | Optional. Configures the DNS server’s (identified by the <IPv6> parameter) lifetime
| lifetime [<4-3600>|expired|infinite] | • <4-3600> – Configures a lifetime in seconds. Specify a value form 4 - 3600 seconds. The default is 600 seconds.
| lifetime [<4-3600>|expired|infinite] | • expired – Advertises that this DNS server’s lifetime has expired and should not be used
| lifetime [<4-3600>|expired|infinite] | • infinite – Advertises that this DNS server’s lifetime is infinite

Examples

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#dns-server 2002::2 lifetime 3000

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy test
advertise mtu
advertise hop-limit
check-ra-consistency
dns-server 2002::2 lifetime 3000
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#

Related Commands

no | Removes the DNS server settings advertised in RAs. Once removed these values are not advertised in RAs.
**4.1.58.2.5 domain-name**

- *ipv6-router-advertisement-policy-mode commands*

Configures the Domain name search label advertised in RAs

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

domain-name <WORD> {lifetime [<4-3600> | expired | infinite]}

**Parameters**
- domain-name <WORD> {lifetime [<4-3600> | expired | infinite]}

| domain-name <WORD> | Configures the Domain name search label advertised in RAs Enter a fully qualified domain name (FQDN), which is an unambiguous domain name available in a router advertisement resource. To distinguish an FQDN from a regular domain name, a trailing period is added. For example, somehost.example.com.
- <WORD> – Specify the Domain name search label. A maximum of four (4) entries can be made per policy.

| lifetime [<4-3600> | expired | infinite] | Optional. Configures the Domain name search label's lifetime
- <4-3600> – Configures a lifetime in seconds. Specify a value form 4 - 3600 seconds. The default is 600 seconds.
- expired – Advertises that this Domain name search label's lifetime has expired and should not be used
- infinite – Advertises that this Domain name search label's lifetime is infinite

**Examples**
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#domain-name TechPubs lifetime infinite

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy test advertise mtu advertise hop-limit check-ra-consistency dns-server 2002::2 lifetime 3000 domain-name TechPubs lifetime infinite

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#

**Related Commands**

| no | Removes the Domain name settings advertised in RAs. Once removed these values are not advertised in RAs. |
4.1.58.2.6 managed-config-flag

Sets the managed address configuration flag in RAs. When set, it indicates that IPv6 addresses are available through DHCPv6. This feature is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
managed-config-flag

Parameters
None

Examples
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#managed-config-flag

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context
ipv6-router-advertisement-policy test
  managed-config-flag
  advertise mtu
  advertise hop-limit
  check-ra-consistency
  dns-server 2002::2 lifetime 3000
  domain-name TechPubs lifetime infinite
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the managed address configuration flag advertised in RAs</td>
</tr>
</tbody>
</table>
### 4.1.58.2.7 nd-reachable-time

*ipv6-router-advertisement-policy-mode commands*

Enables advertisement of neighbor discovery reachable time in RAs. This feature is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
nd-reachable-time [<5000-3600000>|global]
```

**Parameters**

- `nd-reachable-time [<5000-3600000]|global]`

| nd-reachable-time [<5000-3600000]|global] | Configures the interval, in milliseconds, that a node assumes a neighbor is reachable after receiving a reachability confirmation from the neighbor. Therefore, a neighbor is reachable, after being discovered, for a period specified here. This value is advertised in RAs. Use one of the following options:
| | • `<5000-3600000>` – Configures an interface-specific value. Specify a value from 5000 - 3600000 milliseconds. The default is 5000 milliseconds.
| | • `global` – Advertises the neighbor reachable time configured for the system. This is the value configured at the device configuration mode. For more information, see `ipv6`.

**Examples**

```
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#nd-reachable-time 6000
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy test
 managed-config-flag
  nd-reachable-time 6000
 advertise mtu
 advertise hop-limit
 check-ra-consistency
 dns-server 2002::2 lifetime 3000
domain-name TechPubs lifetime infinite
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#
```

**Related Commands**

- `no` Disables advertisement of neighbor reachable time in RAs
4.1.58.2.8 no

ipv6-router-advertisement-policy-mode commands

Removes or reverts router advertisement policy settings. Use the no command to remove or revert the interface-specific parameters that are advertised by link router.

Supported in the following platforms:

• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax


Parameters

• no <PARAMETERS>

Examples

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy test
managed-config-flag
advertise mtu
advertise hop-limit
check-ra-consistency
dns-server 2002::2 lifetime 3000
domain-name TechPubs lifetime infinite
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#no managed-config-flag
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#no nd-reachable-time
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#no check-ra-consistency

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy test
advertise mtu
advertise hop-limit
dns-server 2002::2 lifetime 3000
domain-name TechPubs lifetime infinite
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#
4.1.58.2.9 ns-interval

ipv6-router-advertisement-policy-mode commands

Configures the neighbor solicitation (NS) retransmit timer value advertised in RAs. This is the interval between two successive NS messages. When specified, it enables the sending of the specified value in RAs. This feature is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
ns-interval [<1000-3600000>|global]

Parameters
- ns-interval [<1000-3600000>|global]

| ns-interval [<1000-3600000>|global] | Configures the NS interval advertised in RAs. Use one of the following options:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[&lt;1000-3600000&gt;] – Specify a value from 1000 - 3600000 milliseconds. The default is 1000 milliseconds.</td>
<td></td>
</tr>
<tr>
<td>global – Advertises the NS interval configured for the system. This is configured on the device in the device configuration mode. For more information, see ipv6.</td>
<td></td>
</tr>
</tbody>
</table>

Examples
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#ns-interval 3000

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context
ipv6-router-advertisement-policy test
managed-config-flag
nd-reachable-time global
ns-interval 3000
advertise mtu
advertise hop-limit
check-ra-consistency
dns-server 2002::2 lifetime 3000
domain-name TechPubs lifetime infinite
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#

Related Commands
- no Disables advertisement of NS interval in RAs
4.1.58.2.10 other-config-flag

Sets the other-configuration flag in RAs. When set, it indicates that other configuration details, such as DNS-related information, are available through DHCPv6. This feature is enabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
other-config-flag

Parameters
None

Examples
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#other-config-flag

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the other-config-flag advertised on RAs</td>
</tr>
</tbody>
</table>
4.1.58.2.11 ra

`ipv6-router-advertisement-policy-mode commands`

Configures RA related parameters, such as the interval between two unsolicited successive RAs. It also allows suppression of RAs.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**
```
ra [interval <3-1800>|suppress]
```

**Parameters**
- `ra [interval <3-1800>|suppress]`

| interval <3-1800> | Configures the interval, in seconds, between two unsolicited successive RAs
|                  | • `<3-1800>` – Specify a value from 3 - 1800 seconds. The default is 300 seconds.
|                  | **Note:** The router-lifetime should be at least three times the specified router interval.

| suppress | Enables the suppression of RAs. When enabled, the transmission of RAs in IPv6 packets is suppressed. This option is disabled by default. The `no > ra > suppress` command enables the sending of RAs.

**Examples**
```
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#ra interval 200
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#ra suppress
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy_test
  ra suppress
  ra interval 200
  managed-config-flag
  nd-reachable-time global
  advertise mtu
  advertise hop-limit
  check-ra-consistency
  dns-server 2002::2 lifetime 3000
  domain-name TechPubs lifetime infinite
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#
```

**Related Commands**
```
no
```
| no | Removes the RA interval, and enables the sending of RAs |
4.1.58.2.12 router-lifetime

**ipv6-router-advertisement-policy-mode commands**

Configures the default router’s lifetime, in seconds, advertised in RAs

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`router-lifetime <0-9000>`

**Parameters**
- `router-lifetime <0-9000>`

<table>
<thead>
<tr>
<th>router-lifetime</th>
<th>Configures the default router’s lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-9000&gt;</td>
<td>- <code>&lt;0-9000&gt;</code> – Specify a value from 0 - 9000 seconds. The default value is 1500 seconds.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: A value of “0” indicates that this router is not the default router.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#router-lifetime 2000

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy test ra suppress ra interval 200 managed-config-flag nd-reachable-time global router-lifetime 2000 advertise mtu advertise hop-limit check-ra-consistency dns-server 2002::2 lifetime 3000 domain-name TechPubs lifetime infinite rfs7000-6DCD4B(config-ipv6-radv-policy-test)#

**Related Commands**

| no | Removes the default router’s lifetime |
4.1.58.2.13 router-preference

*ripv6-router-advertisement-policy-mode commands*

Configures the router preference field value advertised in RAs. The options are high, medium, and low. This value is used to prioritize and select the default router when multiple routers are discovered.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
router-preference [high|medium|low]
```

**Parameters**

- `router-preference [high|medium|low]`

---

**Examples**

```
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#router-preference high
```

```
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy test
  ra suppress
  ra interval 200
  managed-config-flag
  nd-reachable-time global
  router-lifetime 2000
  advertise mtu advertise hop-limit
  router-preference high
  check-ra-consistency
dns-server 2002::2 lifetime 3000
domain-name TechPubs lifetime infinite
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#
```
4.1.58.2.14 unicast-solicited-advertisement

Enables unicasting of solicited RAs. This feature is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
unicast-solicited-advertisement

Parameters
None

Examples
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#unicast-solicited-advertisement
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy test
ra suppress
ra interval 200
unicast-solicited-advertisement
managed-config-flag
nd-reachable-time global
router-lifetime 2000
advertise mtu
advertise hop-limit
router-preference high
check-ra-consistency
dns-server 2002::2 lifetime 3000
domain-name TechPubs lifetime infinite
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#

Related Commands

no | Disables unicasting of solicited RAs
### 4.1.59 l2tpv3

**Global Configuration Commands**

Configures a Layer 2 Tunnel Protocol Version 3 (L2TPv3) tunnel policy, used to create one or more L2TPv3 tunnels. The L2TPv3 policy defines the control and encapsulation protocols needed for tunneling layer 2 frames between two IP nodes. This policy enables creation of L2TPv3 tunnels for transporting Ethernet frames between bridge VLANs and physical GE ports. L2TPv3 tunnels can be created between any vendor devices supporting L2TPv3 protocol.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
l2tpv3 policy <L2TPV3-POLICY-NAME>
```

**Parameters**

- `l2tpv3 policy <L2TPV3-POLICY-NAME>`

<table>
<thead>
<tr>
<th>l2tpv3 policy &lt;L2TPV3-POLICY-NAME&gt;</th>
<th>Configures an L2TPv3 tunnel policy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;L2TPV3-POLICY-NAME&gt;</code> — Specify a policy name. The policy is created if it does not exist. To modify an existing L2TPv3, specify its name.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FAEE(config)#l2tpv3 policy L2TPV3Policy1
rfs7000-37FAEE(config-l2tpv3-policy-L2TPV3Policy1)#?
L2tpv3 Policy Mode commands:
  cookie-size   Size of the cookie field present in each l2tpv3 data message
  failover-delay Time interval for re-establishing the tunnel after the failover (RF-Domain manager/VRRP-master/Cluster-master failover)
  force-l2-path-recovery Enables force learning of servers, gateways etc., behind the l2tpv3 tunnel when the tunnel is established
  hello-interval Configure the time interval (in seconds) between l2tpv3 Hello keep-alive messages exchanged in l2tpv3 control connection
  no             Negate a command or set its defaults
  reconnect-attempts Maximum number of attempts to reestablish the tunnel.
  reconnect-interval Time interval between the successive attempts to reestablish the l2tpv3 tunnel
  retry-attempts Configure the maximum number of retransmissions for signaling message
  retry-interval Time interval (in seconds) before the initiating a retransmission of any l2tpv3 signaling message
  rx-window-size Number of signaling messages that can be received without sending the acknowledgement
  tx-window-size Number of signaling messages that can be sent without receiving the acknowledgement
  clrscr         Clears the display screen
  commit         Commit all changes made in this session
  end            End current mode and change to EXEC mode
  exit           End current mode and down to previous mode
  help           Description of the interactive help system
  revert         Revert changes
  service        Service Commands
  show           Show running system information
```
**write**

Write running configuration to memory or terminal

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an existing L2TPv3 tunnel policy</td>
</tr>
<tr>
<td><code>mint-policy</code></td>
<td>Configures the global MiNT policy</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on the L2TPv3 tunnel configuration mode and commands, see *Chapter 22, L2TPV3-POLICY.*
Global Configuration Commands

Configures a MAC ACLs

Access lists define access permissions to the network using a set of rules. Each rule specifies an action taken when a packet matches the rule. If the action is deny, the packet is dropped. If the action is permit, the packet is allowed.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

mac access-list <MAC-ACL-NAME>

Parameters
- mac access-list <MAC-ACL-NAME>

Examples

rfs7000-37FABE(config)#mac access-list test
rfs7000-37FABE(config-mac-acl-test)#?
MAC Extended ACL Configuration commands:
  deny Specify packets to reject
  disable Disable rule if not needed
  no Negate a command or set its defaults
  permit Specify packets to forward
  clrscr Clears the display screen
  commit Commit all changes made in this session
  end End current mode and change to EXEC mode
  exit End current mode and down to previous mode
  help Description of the interactive help system
  revert Revert changes
  service Service Commands
  show Show running system information
  write Write running configuration to memory or terminal

rfs7000-37FABE(config-mac-acl-test)#

Related Commands

no Removes a MAC access control list

NOTE: For more information on MAC access control lists, see Chapter 11, ACCESS-LIST.
4.1.61 management-policy

**Global Configuration Commands**

Configures a management policy. Management policies include services that run on a device, welcome messages, banners, etc.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

management-policy <MANAGEMENT-POLICY-NAME>

**Parameters**

- management-policy <MANAGEMENT-POLICY-NAME>

| MANAGEMENT-POLICY-NAME | Specify the management policy name. If the policy does not exist, it is created. |

**Examples**

 DEVICE(config)#management-policy test
 DEVICE(config-management-policy-test)#?
 Management Mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aaa-login</td>
<td>Set authentication for logins</td>
</tr>
<tr>
<td>allowed-locations</td>
<td>Add allowed locations</td>
</tr>
<tr>
<td>banner</td>
<td>Define a login banner</td>
</tr>
<tr>
<td>ftp</td>
<td>Enable FTP server</td>
</tr>
<tr>
<td>http</td>
<td>Hyper Text Terminal Protocol (HTTP)</td>
</tr>
<tr>
<td>https</td>
<td>Secure HTTP</td>
</tr>
<tr>
<td>idle-session-timeout</td>
<td>Configure idle timeout for a configuration session (GUI or CLI)</td>
</tr>
<tr>
<td>ipv6</td>
<td>IPv6 Protocol</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>privilege-mode-password</td>
<td>Set the password for entering CLI privilege mode</td>
</tr>
<tr>
<td>restrict-access</td>
<td>Restrict management access to the device</td>
</tr>
<tr>
<td>snmp-server</td>
<td>SNMP</td>
</tr>
<tr>
<td>ssh</td>
<td>Enable ssh</td>
</tr>
<tr>
<td>t5</td>
<td>T5 configuration</td>
</tr>
<tr>
<td>telnet</td>
<td>Enable telnet</td>
</tr>
<tr>
<td>user</td>
<td>Add a user account</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
</tr>
</tbody>
</table>

**Related Commands**

- no: Removes an existing management policy
NOTE: For more information on Management policy configuration, see Chapter 15, MANAGEMENT-POLICY.
4.1.62 meshpoint

Global Configuration Commands

Creates a new meshpoint and enters its configuration mode. Use this command to select and configure existing meshpoints.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

meshpoint [MESHPOINT-NAME]|containing <WORD>

Parameters

- meshpoint [MESHPOINT-NAME]|containing <WORD>

Examples

rfs7000-37FABE(config)#meshpoint TestMeshpoint
rfs7000-37FABE(config-meshpoint-TestMeshpoint)#?

Mesh Point Mode commands:

- allowed-vlans Set the allowed VLANs
- beacon-format The beacon format of this meshpoint
- control-vlan VLAN for meshpoint control traffic
- data-rates Specify the 802.11 rates to be supported on this meshpoint
- description Configure a description of the usage of this meshpoint
- force Force suboptimal paths
- meshid Configure the Service Set Identifier for this meshpoint
- neighbor Configure neighbor specific parameters
- no Negate a command or set its defaults
- root Set this meshpoint as root
- security-mode The security mode of this meshpoint
- shutdown Shutdown this meshpoint
- use Set setting to use
- wpa2 Modify ccmp wpa2 related parameters
- clrscr Clears the display screen
- commit Commit all changes made in this session
- do Run commands from Exec mode
- end End current mode and change to EXEC mode
- exit End current mode and down to previous mode
- help Description of the interactive help system
- revert Revert changes
- service Service Commands
- show Show running system information
- write Write running configuration to memory or terminal

rfs7000-37FABE(config-meshpoint-TestMeshpoint)#

Related Commands

- no Removes an existing meshpoint
NOTE: For more information on Meshpoint configuration, see Chapter 26, MESHPOINT.
4.1.63 meshpoint-qos-policy

Global Configuration Commands

Configures a set of parameters that defines the meshpoint quality of service (QoS) policy

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

meshpoint-qos-policy <MESHPOINT-QOS-POLICY-NAME>

Parameters

- meshpoint-qos-policy <MESHPOINT-QOS-POLICY-NAME>

Examples

rfs7000-37FABE(config)#meshpoint-qos-policy TestMeshpointQoS
rfs7000-37FABE(config-meshpoint-qos-TestMeshpointQoS)#?
Mesh Point QoS Mode commands:
accelerated-multicast  Configure accelerated multicast streams address and forwarding QoS classification
no                     Negate a command or set its defaults
rate-limit             Configure traffic rate-limiting parameters on a per-meshpoint/per-neighbor basis
clrscr                 Clears the display screen
commit                 Commit all changes made in this session
do                     Run commands from Exec mode
end                    End current mode and change to EXEC mode
exit                   End current mode and down to previous mode
help                   Description of the interactive help system
revert                 Revert changes
service                Service Commands
show                   Show running system information
write                  Write running configuration to memory or terminal

rfs7000-37FABE(config-meshpoint-qos-TestMeshpointQoS)#

Related Commands

no                      Removes an existing meshpoint QoS policy

NOTE: For more information on Meshpoint QoS policy configuration, see Chapter 26, MESHPOINT.
4.1.64 mint-policy

Global Configuration Commands

Configures the global MiNT policy

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

mint-policy global-default

Parameters

- mint-policy global-default

| global-default | Configures the global default MiNT policy |

Examples

rfs7000-37FABE(config)#mint-policy global-default
rfs7000-37FABE(config-mint-policy-global-default)#?

Mint Policy Mode commands:

- level Mint routing level
- mtu Configure the global Mint MTU
- no Negate a command or set its defaults
- router Mint router
- udp Configure mint UDP/IP encapsulation
- clrscr Clears the display screen
- commit Commit all changes made in this session
- do Run commands from Exec mode
- end End current mode and change to EXEC mode
- exit End current mode and down to previous mode
- help Description of the interactive help system
- revert Revert changes
- service Service Commands
- show Show running system information
- write Write running configuration to memory or terminal

rfs7000-37FABE(config-mint-policy-global-default)#

Related Commands

- no Removes an existing MiNT policy

NOTE: For more information on MiNT policy configuration, see Chapter 14, MINT-POLICY.
4.1.65 **nac-list**

*Global Configuration Commands*

A *Network Access Control* (NAC) policy configures a list of devices that can access a network based on their MAC addresses.

The following table lists NAC list configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>nac-list</td>
<td>Creates a NAC list and enters its configuration mode</td>
<td>page 4-291</td>
</tr>
<tr>
<td>nac-list-mode</td>
<td>Summarizes NAC list configuration mode commands</td>
<td>page 4-292</td>
</tr>
</tbody>
</table>
4.1.65.1 nac-list

nac-list

Configures a NAC list that manages access to the network

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

nac-list <NAC-LIST-NAME>

Parameters

- nac-list <NAC-LIST-NAME>

Examples

rfs7000-37FABE(config)#nac-list test
rfs7000-37FABE(config-nac-list-test)#?
NAC List Mode commands:
  exclude Specify MAC addresses to be excluded from the NAC enforcement list
  include Specify MAC addresses to be included in the NAC enforcement list
  no Negate a command or set its defaults
  clrscr Clears the display screen
  commit Commit all changes made in this session
  do Run commands from Exec mode
  end End current mode and change to EXEC mode
  exit End current mode and down to previous mode
  help Description of the interactive help system
  revert Revert changes
  service Service Commands
  show Show running system information
  write Write running configuration to memory or terminal

rfs7000-37FABE(config-nac-list-test)#

Related Commands

no Removes a NAC list
4.1.65.2 nac-list-mode commands

The following table summarizes NAC list configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>exclude</td>
<td>Specifies the MAC addresses excluded from the NAC enforcement list</td>
<td>page 4-293</td>
</tr>
<tr>
<td>include</td>
<td>Specifies the MAC addresses included in the NAC enforcement list</td>
<td>page 4-294</td>
</tr>
<tr>
<td>no</td>
<td>Cancels an exclude or include NAC list rule</td>
<td>page 4-295</td>
</tr>
</tbody>
</table>
4.1.65.2.1 exclude

`nac-list-mode commands`

Specifies the MAC addresses excluded from the NAC enforcement list

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`exclude <START-MAC> [<END-MAC> precedence <1-1000>|preference <1-1000>]`

Parameters

- `exclude <START-MAC> [<END-MAC> precedence <1-1000>|preference <1-1000>]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;START-MAC&gt;</code></td>
<td>Specifies a range of MAC addresses or a single MAC address to exclude from the NAC enforcement list</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;START-MAC&gt;</code> – Specify the first MAC address in the range.</td>
</tr>
<tr>
<td><code>&lt;END-MAC&gt;</code></td>
<td>Specifies the last MAC address in the range (optional if a single MAC is added to the list)</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;END-MAC&gt;</code> – Specify the last MAC address in the range.</td>
</tr>
<tr>
<td>precedence <code>&lt;1-1000&gt;</code></td>
<td>Sets the rule precedence. Exclude entries are checked in the order of their rule precedence.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;1-1000&gt;</code> – Specify a value from 1 - 1000.</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-nac-list-test)#exclude 00-40-96-B0-BA-2A precedence 1
rfs7000-37FABE(config-nac-list-test)#show context nac-list test
  exclude 00-40-96-B0-BA-2A 00-40-96-B0-BA-2A precedence 1
rfs7000-37FABE(config-nac-list-test)#
```
4.1.65.2.2 include

nac-list-mode commands

Specifies the MAC addresses included in the NAC enforcement list

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

include <START-MAC> [ <END-MAC> precedence <1-1000> ]

Parameters

- include <START-MAC> [ <END-MAC> precedence <1-1000> ]

<table>
<thead>
<tr>
<th>&lt;START-MAC&gt;</th>
<th>Specifies a range of MAC addresses or a single MAC address to include in the NAC enforcement list</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;START-MAC&gt; – Specify the first MAC address in the range.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Use this parameter to specify a single MAC address.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;END-MAC&gt;</th>
<th>Specifies the last MAC address in the range (optional if a single MAC is added to the list)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;END-MAC&gt; – Specify the last MAC address in the range.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>precedence &lt;1-1000&gt;</th>
<th>Sets the rule precedence. Include entries are checked in the order of their rule precedence.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;1-1000&gt; – Specify a value from 1 - 1000.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-nac-list-test)#include 00-15-70-38-06-49 precedence 2
rfs7000-37FABE(config-nac-list-test)#show context nac-list test
  exclude 00-04-96-B0-BA-2A 00-04-96-B0-BA-2A precedence 1
  include 00-15-70-38-06-49 00-15-70-38-06-49 precedence 2
rfs7000-37FABE(config-nac-list-test)#
4.1.65.2.3 no

nac-list-mode commands

Cancels an exclude or include NAC list rule

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [exclude|include]

no [exclude|include] <START-MAC> [<END-MAC> precedence <1-1000>|precedence <1-1000>]

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes or reverts this NAC list's settings based on the parameters passed |

Examples
The following example shows the NAC list ‘test’ settings before the ‘no’ command is executed:

rfs7000-37FABE(config-nac-list-test)#show context
nac-list test
exclude 00-04-96-B0-BA-2A 00-04-96-B0-BA-2A precedence 1
include 00-15-70-38-06-49 00-15-70-38-06-49 precedence 2
rfs7000-37FABE(config-nac-list-test)#

rfs7000-37FABE(config-nac-list-test)#no exclude 00-40-96-B0-BA-2A precedence 1

The following example shows the NAC list ‘test’ settings after the ‘no’ command is executed:

rfs7000-37FABE(config-nac-list-test)#show context
nac-list test
include 00-15-70-38-06-49 00-15-70-38-06-49 precedence 2
rfs7000-37FABE(config-nac-list-test)#

Related Commands

| exclude | Specifies MAC addresses excluded from the NAC enforcement list |
| include | Specifies MAC addresses included in the NAC enforcement list |
4.1.66 `no`

- **Global Configuration Commands**

Negates a command, or reverts configured settings to their default.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no alias [address-range <ADDRESS-RANGE-ALIAS-NAME>|host <HOST-ALIAS-NAME>|network <NETWORK-ALIAS-NAME>|network-group <NETWORK-GROUP-ALIAS-NAME>] [address-range|host|network|network-service <NETWORK-SERVICE-ALIAS-NAME>|number <NUMBER-ALIAS-NAME>|string <STRING-ALIAS-NAME>] vlan <VLAN-ALIAS-NAME>
no application <APPLICATION-NAME>
no [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600|vx9000] <MAC>
no client-identity <CLIENT-IDENTITY-NAME>
no client-identity-group <CLIENT-IDENTITY-GROUP-NAME>
no device {containing <WORD>} [{filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600|vx9000}]
no customize [hostname-column-width|show-wireless-client|show-wireless-client-stats|
show-wireless-client-stats-rf|show-wireless-meshpoint|
show-wireless-meshpoint-neighbor-stats|show-wireless-meshpoint-neighbor-stats-rf|

no password-encryption secret 2 <OLD-PASSPHRASE>

no profile {ap621|ap622|ap650|ap6511|ap6521|ap6550|ap71xx|ap7502|ap7522|ap7532|
ap7562|ap81xx|ap82xx|ap84xx|ap8533|ex3524|ex3548|containing|filter|rfs4000|rfs6000|
rfs7000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600|t5|vx9000} <PROFILE-NAME>

no wlan [<WLAN-NAME>|all|containing <WLAN-NAME-SUBSTRING>] {on <DEVICE-NAME>}

The following 'no' commands are specific to the RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000 platforms:
no t5 <T5-DEVICE-MAC>

The following 'no' commands are specific to the RFS4000, RFS6000, NX45XX, NX65XX, and NX9000 platforms:
no bgp [as-path-list|community-list|extcommunity-list|ip-access-list|ip-prefix-list] <LIST-NAME>

The following 'no' commands are specific to the NX45XX, NX65XX, NX9000 series service platforms:
no smart-cache-policy <SMART-CACHE-POLICY-NAME>

no route-map <ROUTE-MAP-NAME>

The following 'no' commands are specific to the AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP8132, RFS4000, RFS6000, RFS7000, NX45XX and NX65XX platforms:
no url-filter <URL-FILTER-NAME>
no url-list <URL-LIST-NAME>
no web-filter-name <WEB-FILTER-NAME>

The following 'no' command is specific to the NX9000 series service platforms:
no vx9000 <VX9000-MAC>

The following 'no' command is specific to the VX9000 virtual machine platform:
no database-client-policy <POLICY-NAME>

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes or resets settings, configurable in the global configuration mode, based on the parameters passed |

Examples

<DEVICE>(config)#no ?
aaa-policy            Delete a aaa policy
aaa-tacacs-policy     Delete a aaa tacacs policy
alias                 Alias
ap621                 Delete an AP621 access point
ap622                 Delete an AP622 access point
ap650                 Delete an AP650 access point
ap6511                Delete an AP6511 access point
ap6521                Delete an AP6521 access point
ap6522                Delete an AP6522 access point
ap6532                Delete an AP6532 access point
ap6562                Delete an AP6562 access point
ap71xx                Delete an AP71XX access point
ap7502                Delete an AP7502 access point
ap7522                Delete an AP7522 access point
ap7532                Delete an AP7532 access point
ap7562                              Delete an AP7562 access point
ap81xx                              Delete an AP81XX access point
ap82xx                              Delete an AP82XX access point
ap8432                              Delete an AP8432 access point
ap8533                              Delete an AP8533 access point
application                          Delete an application
application-policy                  Delete an application policy
association-acl-policy              Delete an association-acl policy
auto-provisioning-policy            Delete an auto-provisioning policy
bgp                                  BGP Configuration
bonjour-gw-discovery-policy         Disable Bonjour Gateway discovery policy
bonjour-gw-forwarding-policy        Disable Bonjour Gateway Forwarding policy
bonjour-gw-query-forwarding-policy  Disable Bonjour Gateway Query Forwarding policy
captive-portal                      Delete a captive portal
client-identity                     Client identity (DHCP Device Fingerprinting)
client-identity-group               Client identity group (DHCP Fingerprint Database)
crypto-cmp-policy                   CMP policy
customize                            Restore the custom cli commands to default
database-client-policy              Configure database policy
database-policy                     Configure database policy
device                              Delete multiple devices
device-categorization              Delete device categorization object
dhcp-server-policy                  DHCP server policy
dhcpv6-server-policy                DHCPv6 server related configuration
dns-whitelist                       Delete a whitelist object
event-system-policy                 Delete a event system policy
ex3500                              EX3500 device
ex3500-management-policy            Delete a ex3500 management policy
ex3500-qos-class-map-policy         Delete a ex3500 qos class-map policy
ex3500-qos-policy-map               Delete a ex3500 qos policy-map
ex3524                              Delete an EX3524 wireless controller
ex3548                              Delete an EX3548 wireless controller
firewall-policy                     Configure firewall policy
global-association-list            Delete a global association list
guest-management                   Delete a guest management policy
igmp-snoop-policy                   Remove device onboard igmp snoop policy
inline-password-encryption          Disable storing encryption key in the startup configuration file
ip                                   Internet Protocol (IP)
ipv6                                 Internet Protocol version 6 (IPv6)
ipv6-router-advertisement-policy    IPv6 Router Advertisement related configuration
l2tpv3                               Negate a command or set its defaults
mac                                  MAC configuration
management-policy                   Delete a management policy
meshpoint                           Delete a meshpoint object
meshpoint-qos-policy                 Delete a mesh point QoS configuration policy
nac-list                             Delete an network access control list
nsight-policy                       Delete a nsight policy
nx45xx                              Delete an NX45XX integrated services platform
nx5500                              Delete an NX5500 wireless controller
nx65xx                              Delete an NX65XX integrated services platform
nx75xx                              Delete an NX75XX wireless controller
nx9000                              Delete an NX9000 wireless controller
passpoint-policy                    Delete a passpoint configuration policy
password-encryption                 Disable password encryption in configuration
profile                             Delete a profile and all its associated configuration
radio-qos-policy                    Delete a radio QoS configuration policy
radius-group                        Local radius server group configuration
radius-server-policy                Remove device onboard radius policy
radius-user-pool-policy Configure Radius User Pool
rf-domain Delete one or more RF-domains and all their associated configurations
rfs4000 Delete an RFS4000 wireless controller
rfs6000 Delete an RFS6000 wireless controller
rfs7000 Delete an RFS7000 wireless controller
roaming-assist-policy Delete a roaming-assist policy
role-policy Role based firewall policy
route-map Dynamic routing route map Configuration
rtl-server-policy Policy Based Routing Configuration
schedule-policy Delete a schedule policy
sensor-policy Delete a sensor policy
smart-cache-policy Delete a content caching
smart-rf-policy Delete a smart-rf-policy
t5 Delete an T5 wireless controller
url-filter Delete a url filter
url-list Delete a URL list
vx9000 Delete an VX9000 wireless controller
web-filter-policy Delete a web filter policy
wips-policy Delete a wips policy
wlan Delete a wlan object
wlan-qos-policy Delete a wireless lan QoS configuration policy

service Service Commands

<DEVICE>(config)#
4.1.67 nsight-policy

- **Global Configuration Commands**

The following table lists NSight policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>nsight-policy</td>
<td>Creates an NSight policy and enters its configuration mode</td>
<td>page 4-301</td>
</tr>
<tr>
<td>nsight-policy commands</td>
<td>Summarizes NSight policy configuration mode commands</td>
<td>page 4-304</td>
</tr>
</tbody>
</table>
4.1.67.1 nsight-policy

Creates an NSight policy and enters its configuration mode

The NSight policy is an advance management, analytics, reporting, and troubleshooting tool, which when created and applied at the RF Domain level allows the RF Domain manager to send statistics (polled from devices within the RF Domain) to the NOC. The NOC, when enabled as the NSight server, stores this data in a locally or externally hosted MongoDB database. This large, complex data are collated and presented on the NOC’s GUI in visual forms that are easy to understand and manage. For large networks, enabling NSight removes the inadequacies of the existing data collection, presentation, and analytics framework.

Zebra NSight is an advanced network visibility, service assurance, and analytics platform that is fast and easy to use. NSight is a powerful feature-rich management module addition to the existing WiNG 5.8 (or later) platform. It simplifies network monitoring, troubleshooting and reporting and enables the creation of customized role-based dashboards. It also provides assistance in projecting any extensions necessary to accommodate increased network client or throughput demands. NSight also provides a unique multi-dimensional monitoring and reporting capability based on time, network analytics and user role.

Major NSight features include:

- **Network statistic and event visualization** - Simplified and unified network views based on defined user roles
- **Custom dashboards** - Live network health information in real-time to optimally assist network administrators
- **Live troubleshooting tools** - Packet capture, wireless debug logs, TCP/IP ping and traceroute
- **Interactive floor maps with timeline views** - Visualize and identify potential issues and problems areas
- **Real-time trend analysis** - Simplify network growth planning
- **Exceptionally responsive interface** - Any information the admin needs is three, or less, clicks away

The WiNG NSight implementation consists of the following components:

- An NSight server hosted on the NOC
- A MongoDB database hosted on the NOC. This database consists of AP statistics gathered by RF Domain managers.
- An NSight UI application running on the NOC
- An NSight client hosted on the RF Domain manager. This is the SSM statistics module that periodically gathers statistics from adopted APs and forwards to the NSight server.

---

**NOTE:** NSight is a licensed option. To enable the NSight, navigate to the NSight server’s device configuration mode and apply the NSight license.

---

To enable NSight, follow the steps given below:

1. Create an NSight policy to enable the NSight server.

   - `nx9500-6C8809(config-nsight-policy-nsight-for-noc)#enable`
   - `nx9500-6C8809(config-nsight-policy-nsight-for-noc)#nsight-server`
   - `nx9500-6C8809(config-nsight-policy-nsight-for-noc)#show context`
   - `nsight-policy nsight-for-noc`
   - `nsight-server`
   - `nx9500-6C8809(config-nsight-policy-nsight-for-noc)#`

2. Apply the policy configured in step 1 to the NOC. This enables the NOC to recognize itself as the NSight server.

   - `nx9500-6C8809(config)#self`
   - `nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#use nsight-policy nsight-for-noc`

3. Create another NSight policy pointing to the NSight server host.

   - `nx9500-6C8809(config-nsight-policy-nsight-for-rfdm)#enable`
nx9500-6C8809 (config-nsight-policy-nsight-for-rfdm)#server host 192.168.13.13
nx9500-6C8809 (config-nsight-policy-nsight-for-rfdm)#show context
nsight-policy nsight-for-rfdm
   server host 192.168.13.13 https
nx9500-6C8809 (config-nsight-policy-nsight-for-rfdm)#

4. Apply the policy configured in step 3 to the RF Domain. This enables the domain manager to collect statistics from the access points and send to the NOC serving as the NSight server.

nx9500-6C8809 (config)#rf-domain TechPubs
nx9500-6C8809 (config-rf-domain-TechPubs)#use nsight-policy nsight-for-rfdm
nx9500-6C8809 (config-rf-domain-TechPubs)#show context
rf-domain TechPubs
   location SanJose
   timezone America/Los_Angeles
   country-code us
   use nsight-policy nsight-for-rfdm
nx9500-6C8809 (config-rf-domain-TechPubs)#

NOTE: Once the NSight server is up and running, and the RF Domains also have the NSight server host configured, on the NSight server’s device configuration mode, configure the data-update interval related parameters. For more information, see nsight.

The NOC stores the statistical data, received from RF Domain managers, in the MongoDB database. This data contains following information:

- Operating parameters of devices – Fixed information of devices, such as IP addresses, wired interface status, radio operating parameters (channel, power, etc.)
- SMART RF neighbor information – SMART RF neighbors’ data for every radio. This data is used to generate and display heat-maps on floor map. Any changes in the SMART RF data is reported to the MART server and stored in the database.
- Rogue AP information – Rogue AP list and rogue AP status. Any changes in the rouge AP list or status is reported to the MART server and stored in the database.
- Wireless client list – Details of wireless clients within the RF Domain
- Wireless access point statistics – Statistics of all the APs in the RF Domain. AP statistics includes details, such as number of bytes transferred since the last reporting interval, number of TX retries, signal-noise-ratio (SNR), noise, RF quality index, client count, etc.
- Wireless client statistics – Statistics of all the wireless clients in the RF Domain. Wireless client statistics includes details, such as number of bytes transferred from last reporting interval, number of TX retries, SNR, RF quality index, etc.
- Wired interface statistics – Statistics of wired interfaces of all APs. It includes details, such as interface status, number of bytes transferred from last reporting interval, etc.
- Event history – Event details for all APs adopted by the NOC. These are events received by the Cfgd every 30 seconds and sent to the MART server. Each event consists of the RF Domain name, wireless client MAC if applicable, AP MAC, event mnemonic, event timestamp, and the event string itself.

Apart from the above mentioned data, the MongoDB database contains information that is reported to the NSight server by the Cfgd running on the NOC. These are:

- Device information – Information of all devices (APs and controllers) within the network, such as hostname, device type, firmware version, location, geo-coordinates, etc. This information is collected and reported by the Cfgd running on the NOC.
• Configuration elements, such as RF Domains, RF Domain location hierarchy, WLANs.

**NOTE:** All network devices (APs and controllers) should be upgraded to the latest WiNG build for NSight and MongoDB implementation.

Supported in the following platforms:
• Service Platforms — NX7500, NX9500, NX9510, NX9600, VX9000

**Syntax**

nsight-policy <NSIGHT-POLICY-NAME>

**Parameters**

• nsight-policy <NSIGHT-POLICY-NAME>

| <NSIGHT-POLICY-NAME> | Specify the NSight policy name. If the policy does not exist, it is created. |

**Examples**

nx9500-6C8809(config)#nsight-policy test
nx9500-6C8809(config-nsight-policy-test)#?

Nsight Policy Mode commands:
  enable              Enable this Nsight policy
  event-history-size  Size of the event history collection
  history-ttl         Time to live for historical data
  no                  Negate a command or set its defaults
  nsight-server       Enable Nsight server functionality
  server              Configure Nsight server
  clrscr              Clears the display screen
  commit              Commit all changes made in this session
  end                 End current mode and change to EXEC mode
  exit                End current mode and down to previous mode
  help                Description of the interactive help system
  revert              Revert changes
  service             Service Commands
  show                Show running system information
  write               Write running configuration to memory or terminal

nx9500-6C8809(config-nsight-policy-test)#

**Related Commands**

| no | Removes an existing NSight policy |
4.1.67.2 nsight-policy commands

The following table summarizes NSight policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>enable</td>
<td>Enables this NSight policy</td>
<td>page 4-305</td>
</tr>
<tr>
<td>event-history-size</td>
<td>Converts and sizes the NSight event history collection</td>
<td>page 4-306</td>
</tr>
<tr>
<td>history-ttl</td>
<td>Configures the time-to-live (TTL), in days, for historical data related to clients and devices</td>
<td>page 4-307</td>
</tr>
<tr>
<td>nsight-server</td>
<td>Enables NSight server functionality and configures the SMTP report delivery settings</td>
<td>page 4-308</td>
</tr>
<tr>
<td>server</td>
<td>Configures the NSight server host. This configuration is used by the NSight client to identify the NSight server host.</td>
<td>page 4-310</td>
</tr>
<tr>
<td>no</td>
<td>Removes this NSight policy settings</td>
<td>page 4-311</td>
</tr>
</tbody>
</table>
4.1.67.2.1 enable

*nsight-policy commands*

Enables this NSight policy. The default setting is enabled.

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600

**Syntax**

`enable`

**Parameters**

None

**Examples**

```
nx9510-6C8A5C(config-nsight-policy-test2)#enable
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables this NSight policy</td>
</tr>
</tbody>
</table>
4.1.67.2.2  event-history-size

*nsight-policy commands*

Converts and sizes the NSight event history collection to a capped collection. The conversion occurs when upgrading. Use this command to define the NSight event history collection’s size and prevent its unbounded growth. Note, resizing the collection results in the collection contents being dropped.

Supported in the following platforms:

- Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax

`event-history-size [high|low|medium]`

Parameters

- `event-history-size [high|low|medium]`

| event-history-size [high|low|medium] | Defines the size of the NSight event history collection. The options are:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>high</td>
<td>high – Sets the size at approximately 10 M events</td>
</tr>
<tr>
<td>low</td>
<td>low – Sets the size at approximately 500 K events. This is the default setting.</td>
</tr>
<tr>
<td>medium</td>
<td>medium – Sets the size at approximately 5 M events</td>
</tr>
</tbody>
</table>

Examples

nx9500-6C8809(config-nsight-policy-test)#event-history-size medium

nx9500-6C8809(config-nsight-policy-test)#show context
nsight-policy test
  event-history-size medium
nx9500-6C8809(config-nsight-policy-test)#

Related Commands

- `no`  
  Reverts the NSight event history collection size to default (5 M)
### 4.1.67.2.3 history-ttl

*nsight-policy commands*

Configures the *time-to-live* (TTL), in days, for historical data related to clients, devices, and guest users. This is the duration for which clients, devices, or guest user related data is retained in the NSight database.

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600

**Syntax**

```
history-ttl [clients|devices|guest-clients]
```

```
history-ttl [clients|devices] <1-3650>
```

```
history-ttl guest-clients <8-48>
```

**Parameters**

- `history-ttl [clients|devices] <1-3650>`
- `history-ttl guest-clients <8-48>`

**Examples**

```
nx9500-6C8809(config-nsight-policy-test)# history-ttl clients 250
```

```
nx9500-6C8809(config-nsight-policy-test)# show context nsight-policy test
```

```
  history-ttl clients 250
```

```
nx9500-6C8809(config-nsight-policy-test)#
```

**Related Commands**

- `no` — Reverts the NSight clients or devices TTL duration to default (180 days)
### 4.1.67.2.4 nsight-server

#### nsight-policy commands

Enables NSight server functionality and configures the SMTP report delivery settings. When applied to a device (NOC), this policy enables the device to recognize itself as the NSight server.

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600

**Syntax**

```
nsight-server {smtp-report-delivery|standalone}
```

```
nsight-server {smtp-report-delivery host <WORD> sender <EMAIL-ADD> [port <1-65535>]
security [none|ssl|starttls]|username <USER-NAME> password [0|2|<WORD>]
}
```

```
nsight-server {standalone}
```

**Parameters**

- **nsight-server {smtp-report-delivery host <WORD> sender <EMAIL-ADD> [port <1-65535>]
security [none|ssl|starttls]|username <USER-NAME> password [0|2|<WORD>]}**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nsight-server</td>
<td>Enables NSight server functionality on the host using this NSight policy</td>
</tr>
</tbody>
</table>
| smtp-report-delivery host <WORD> | Optional. Configures SMTP report delivery settings  
  - host <WORD> – Configures the SMTP server host  
  - <WORD> – Specify the SMTP server host’s IP address or hostname. |
| sender <EMAIL-ADD> | Optional. Configures the SMTP sender’s e-mail address  
  - <EMAIL-ADD> – Specify the sender’s e-mail address. |
| port <1-65535> | Optional. Configures the SMTP server port  
  - <1-65535> – Specify the port from 1 - 65535. |
| security [none|ssl|starttls] | Optional. Configures the encryption protocol used by the SMTP server. The options are:  
  - none – Uses no encryption  
  - ssl – Uses SSL encryption  
  - starttls – Uses STARTTLS encryption |
| username <USER-NAME> password [0|2|<WORD>] | Optional. Configures the SMTP username  
  - <USER-NAME> Specify the user name  
  - password [0|2|<WORD>] – Configures the password associated with the above configured user  
    - 0 – Configures a clear text password  
    - 2 – Configures an encrypted password  
    - <WORD> – Enter the password. |
| nsight-server {standalone} | Enables NSight server functionality on the host using this NSight policy |
| standalone | Optional. Configures NSight server as standalone |
Examples
nx9510-6C8A5C(config-nsight-policy-test2)#nsight-server
nx9510-6C8A5C(config-nsight-policy-test2)#show context
nsight-policy test2
  nsight-server
nx9510-6C8A5C(config-nsight-policy-test2)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables NSight server functionality on this NSight policy</td>
</tr>
</tbody>
</table>
server

nsight-policy commands

Configures the NSight server host. This configuration is used by the NSight client to identify the NSight server host. Supported in the following platforms:

- Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax

server host [<IP>|<HOSTNAME>|<X:X::X:X>] {http|https}

Parameters

- server host [<IP>|<HOSTNAME>|<X:X::X:X>] {http|https}

| server host [<IP>|<HOSTNAME>|<X:X::X:X>] | Configures the NSight server host's address. Use one of the following options to identify the NSight server host:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;IP&gt; – Configures the NSight server's IPv4 address</td>
<td></td>
</tr>
<tr>
<td>• &lt;HOSTNAME&gt; – Configures the NSight server's hostname</td>
<td></td>
</tr>
<tr>
<td>• &lt;X:X::X:X&gt; – Configures the NSight server's IPv6 address</td>
<td></td>
</tr>
</tbody>
</table>
| {http|https} | Optional. Configures the protocol used to communicate with the NSight server:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• http – Optional. Uses HTTP to communicate</td>
<td></td>
</tr>
<tr>
<td>• https – Optional. Uses HTTPS to communicate (this is the default setting)</td>
<td></td>
</tr>
</tbody>
</table>

Examples

nx9510-6C8A5C(config-nsight-policy-test2)#server host 172.22.0.153 http

nx9510-6C8A5C(config-nsight-policy-test2)#show context
nsight-policy test2
server host 172.22.0.153 http
nsight-server

nx9510-6C8A5C(config-nsight-policy-test2)#

Related Commands

- **no** | Removes NSight server host settings from this NSight policy
4.1.67.2.6 no

nsight-policy commands

Removes NSight policy settings

Supported in the following platforms:
   • Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax

no [enable|event-history-size|history-ttl [clients|devices|guest-clients]|nsight-server {smtp-report-delivery}|server host [<IP>|<HOSTNAME>|<X::X::X::X>]]

Parameters

• no <PARAMETERS>

no <PARAMETERS> Removes NSight policy settings based on the parameters passed

Examples

The following example shows the NSight policy ‘test2’ settings before the ‘no’ command is executed:

```
nx9510-6C8A5C(config-nsight-policy-test2)#show context nsight-policy test2
  server host 172.22.0.153 http
  nsight-server
```

```
nx9510-6C8A5C(config-nsight-policy-test2)#no server host 172.22.0.153
```

The following example shows the NSight policy ‘test2’ settings after the ‘no’ command is executed:

```
nx9500-6C8809(config-nsight-policy-test2)#show context nsight-policy test2
  nsight-server
```

```
nx9510-6C8A5C(config-nsight-policy-test2)#
```
4.1.68 passpoint-policy

Global Configuration Commands

Creates a new passpoint policy and enters its configuration mode

The passpoint policy implements the Hotspot 2.0 Wi-Fi Alliance standard, enabling interoperability between clients, infrastructure, and operators. It makes a portion of the IEEE 802.11u standard mandatory and adds Hotspot 2.0 extensions that allow clients to query a network before actually attempting to join it.

The passpoint policy allows a single or set of Hotspot 2.0 configurations to be global and referenced by the devices that use it. It is mapped to a WLAN. However, only primary WLANs on a BSSID will have their passpoint policy configuration used.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

passpoint-policy <POLICY-NAME>

Parameters

- passpoint-policy <POLICY-NAME>

Examples

rfs4000-229D58(config)#passpoint-policy test
rfs4000-229D58(config-passpoint-policy-test)#?
Passpoint Policy Mode commands:
3gpp                   Configure a 3gpp plmn (public land mobile network) id
access-network-type    Set the access network type for the passpoint
connection-capability  Configure the connection capability for the passpoint
domain-name            Add a domain-name for the passpoint
hessid                 Set a homogeneous ESSID value for the passpoint
internet               Advertise the passpoint having internet access
ip-address-type        Configure the advertised ip-address-type
nai-realm              Configure a NAI realm for the passpoint
net-auth-type          Add a network authentication type to the passpoint
no                     Negate a command or set its defaults
operator               Add configuration related to the operator of the passpoint
osu                    Online signup
roam-consortium        Add a roam consortium for the passpoint
venue                  Set the venue parameters of the passpoint
wan-metrics            Set the wan-metrics of the passpoint
clrscr                 Clears the display screen
commit                 Commit all changes made in this session
do                     Run commands from Exec mode
end                     End current mode and change to EXEC mode
exit                    End current mode and down to previous mode
help                    Description of the interactive help system
revert                  Revert changes
service                 Service Commands
show                    Show running system information
write                   Write running configuration to memory or terminal
rfs4000-229D58(config-passpoint-policy-test)#
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes an existing passpoint policy</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on passpoint policy, see Chapter 27, PASSPOINT POLICY.
## 4.1.69 password-encryption

### Global Configuration Commands

Enables password encryption

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
password-encryption secret 2 <LINE>
```

**Parameters**

- `secret 2 <LINE>`
  
  Encrypts passwords with a secret phrase
  
  - 2 – Specifies the encryption type as either SHA256 or AES256
  
  - `<LINE>` – Specify the encryption passphrase.

**Examples**

```
rfs7000-37FABE(config)#password-encryption secret 2 example_company
```

**Related Commands**

- `no` Disables password encryption
4.1.70 profile

Global Configuration Commands

Configures profile related commands. If no parameters are given, all profiles are selected.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
profile {anyap|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|
ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|containing|filter|rfs4000|rfs6000|
   rfs7000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600}
```

```
profile {anyap|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|
ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|containing|filter<rfs4000|rfs6000|
rfs7000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600} <DEVICE-PROFILE-NAME>
```

```
profile {containing <DEVICE-PROFILE-NAME>} {filter type [ap621|ap622|ap650|ap6511|
ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|
rfs4000|rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600}
```

Parameters

- profile {anyap|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|
ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45xx|
   nx5500|nx65xx|nx75xx|nx9000|nx9600} <DEVICE-PROFILE-NAME>

profile <DEVICE-TYPE> <DEVICE-PROFILE-NAME>

Configures device profile commands. If no device profile is specified, the system configures all device profiles.

- <DEVICE-TYPE> – Select the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, and NX9600. After specifying the device type, specify the profile name.
- <DEVICE-PROFILE-NAME> – Specify the profile name.

Note: Select 'anyap' to configure a profile applicable to any access point.

Note: The NX9600 profile option is only available on an NX9600 device.

- profile {containing <DEVICE-PROFILE-NAME>} {filter type [ap621|ap622|ap650|ap6511|
ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|
rfs4000|rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600}

profile containing <DEVICE-PROFILE-NAME>

Optional. Configures profiles that contain a specified sub-string in the hostname

- <DEVICE-PROFILE-NAME> – Specify a substring in the profile name to filter profiles.
<table>
<thead>
<tr>
<th>filter type</th>
<th>Optional. An additional filter used to configure a specific type of device profile. If no device type is specified, the system configures all device profiles.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• type – Filters profiles by the device type. Select a device type from the following options: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, and NX9600.</td>
<td></td>
</tr>
<tr>
<td>Note: The NX9600 profile option is only available on an NX9600 device.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>profile</th>
<th>Configures device profile commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>filter type</td>
<td>Optional. An additional filter used to configure a specific type of device profile. If no device type is specified, the system configures all device profiles.</td>
</tr>
<tr>
<td>• type – Filters profiles by the device type. Select a device type from the following options: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, and NX9600.</td>
<td></td>
</tr>
<tr>
<td>Note: The NX9600 profile option is only available on an NX9600 device.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
<DEVICE>(config)#profile <DEVICE-TYPE> <PROFILE-NAME>
<DEVICE>(config-profile-<PROFILE-NAME>)#?
```

Profile Mode commands:

- **adopter-auto-provisioning-policy-lookup** Use centralized auto-provisioning policy when adopted by another controller
- **adoption** Adoption configuration
- **alias** Alias
- **application-policy** Application Policy configuration
- **area** Set name of area where the system is located
- **arp** Address Resolution Protocol (ARP)
- **auto-learn** Auto learning
- **autogen-uniqueid** Autogenerate a unique id
- **autostart** Autostart settings
- **bluetooth-detection** Detect Bluetooth devices using the Bluetooth USB module - there will be interference on 2.4 Ghz radio in wlan mode
- **bridge** Ethernet bridge
- **captive-portal** Captive portal
- **cdp** Cisco Discovery Protocol
- **cluster** Cluster configuration
- **configuration-persistence** Enable persistence of configuration across reloads (startup config file)
- **controller** WLAN controller configuration
- **critical-resource** Critical Resource
- **crypto** Encryption related commands
- **database** Database command
- **device-upgrade** Device firmware upgrade
- **dot1x** 802.1X
- **dpi** Enable Deep-Packet-Inspection (Application Assurance)
- **dscp-mapping** Configure IP DSCP to 802.1p priority mapping for untagged frames
- **email-notification** Email notification configuration
traffic-class-mapping Configure IPv6 traffic class to 802.1p priority mapping for untagged frames
traffic-shape Traffic shaping
tunnel-controller Tunnel Controller group this controller belongs to
trustpoint Assign a trustpoint to a service
use Set setting to use
vrrp VRRP configuration
vrrp-state-check Publish interface via OSPF/BGP only if the interface VRRP state is not BACKUP
wep-shared-key-auth Enable support for 802.11 WEP shared key authentication
clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
write Write running configuration to memory or terminal

<DEVICE>(config-profile-<PROFILE-NAME>)#

<table>
<thead>
<tr>
<th>Related Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
</tr>
</tbody>
</table>

**NOTE:** For more information on profiles and how to configure profiles, see Chapter 7, **PROFILES**.
4.1.71 radio-qos-policy

Global Configuration Commands

Configures a radio quality-of-service (QoS) policy

Supported in the following platforms:
  - Wireless Controllers — RFS4011

Syntax

radio-qos-policy <RADIO-QOS-POLICY-NAME>

Parameters

- radio-qos-policy <RADIO-QOS-POLICY-NAME>

Examples

rfs7000-37FABE(config)#radio-qos-policy test
rfs7000-37FABE(config-radio-qos-test)#

Radio QoS Mode commands:

- accelerated-multicast Configure multicast streams for acceleration
- admission-control Configure admission-control on this radio for one or more access categories
- no Negate a command or set its defaults
- smart-aggregation Configure smart aggregation parameters
- wmm Configure 802.11e/Wireless MultiMedia parameters

clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

rfs7000-37FABE(config-radio-qos-test)#

Related Commands

no Removes an existing Radio QoS policy

NOTE: For more information on radio qos policy, see Chapter 17, RADIO-QOS-POLICY.
4.1.72 radius-group

Global Configuration Commands

Configures RADIUS user group parameters

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

radius-group <RADIUS-GROUP-NAME>

Parameters

- radius-group <RADIUS-GROUP-NAME>

Examples

rfs7000-37FABE(config)#radius-group testgroup
rfs7000-37FABE(config-radius-group-testgroup)#?

Radius user group configuration commands:

- guest Make this group a Guest group
- no Negate a command or set its defaults
- policy Radius group access policy configuration
- rate-limit Set rate limit for group
- clrscr Clears the display screen
- commit Commit all changes made in this session
- do Run commands from Exec mode
- end End current mode and change to EXEC mode
- exit End current mode and down to previous mode
- help Description of the interactive help system
- revert Revert changes
- service Service Commands
- show Show running system information
- write Write running configuration to memory or terminal

rfs7000-37FABE(config-radius-group-testgroup)#

Related Commands

- no Removes an existing RADIUS group

NOTE: For more information on RADIUS user group commands, see Chapter 16, RADIUS-POLICY.
4.1.73 **radius-server-policy**

Global Configuration Commands

Creates an onboard device RADIUS policy

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```plaintext
radius-server-policy <RADIUS-SERVER-POLICY-NAME>
```

Parameters

- `radius-server-policy <RADIUS-SERVER-POLICY-NAME>`

Examples

```plaintext
rfs7000-37FABE(config)#radius-server-policy testpolicy
rfs7000-37FABE(config-radius-server-policy-testpolicy)#
```

Radius Configuration commands:

- `authentication` Radius authentication
- `bypass` Bypass Certificate Revocation List (CRL) check
- `chase-referral` Enable chasing referrals from LDAP server
- `crl-check` Enable Certificate Revocation List (CRL) check
- `ldap-agent` LDAP Agent configuration parameters
- `ldap-group-verification` Enable LDAP Group Verification setting
- `ldap-server` LDAP server parameters
- `local` RADIUS local realm
- `num` RADIUS client
- `no` Negate a command or set its defaults
- `proxy` RADIUS proxy server
- `session-resumption` Enable session resumption/fast reauthentication by using cached attributes
- `termination` Enable Eap termination for proxy requests
- `use` Set setting to use

```plaintext
clrscr
commit
do
end
exit
help
revert
service
show
write
```

```plaintext
rfs7000-37FABE(config-radius-server-policy-testpolicy)#
```

Related Commands

- `no` Removes an existing RADIUS server policy

**NOTE:** For more information on RADIUS server policy commands, see Chapter 16, RADIUS-POLICY.
4.1.74 radius-user-pool-policy

Global Configuration Commands

Configures a RADIUS user pool

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

radius-user-pool-policy <RADIUS-USER-POOL-POLICY-NAME>

Parameters

- radius-user-pool-policy <RADIUS-USER-POOL-POLICY-NAME>

Examples

rfs7000-37FABE(config)#radius-user-pool-policy testpool
rfs7000-37FABE(config-radius-user-pool-testpool)#?

Radius User Pool Mode commands:
  duration  Set a guest user’s access duration
  no        Negate a command or set its defaults
  user      Radius user configuration

  clrscr   Clears the display screen
  commit   Commit all changes made in this session
  do       Run commands from Exec mode
  end      End current mode and change to EXEC mode
  exit     End current mode and down to previous mode
  help     Description of the interactive help system
  revert   Revert changes
  service  Service Commands
  show     Show running system information
  write    Write running configuration to memory or terminal

rfs7000-37FABE(config-radius-user-pool-testpool)#

Related Commands

| no | Removes an existing RADIUS user pool |

NOTE: For more information on RADIUS user group commands, see Chapter 16, RADIUS-POLICY.
### 4.1.75 `rename`

Global Configuration Commands

Renames and existing TLO

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP91XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
rename tlo <TLO-NAME>
```

**Parameters**

- `rename tlo <TLO-NAME> <NEW-TLO-NAME>`

<table>
<thead>
<tr>
<th><code>rename tlo &lt;TLO-NAME&gt; &lt;NEW-TLO-NAME&gt;</code></th>
<th>Renames an existing TLO object</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;TLO-NAME&gt;</code> – Specify the TLO’s name. This is the TLO that is to be renamed.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;NEW-TLO-NAME&gt;</code> – Specify the new name for this TLO</td>
</tr>
</tbody>
</table>

**Examples**

The following example shows the top level objects available for renaming:

Enter `rename` and press **Tab** to list top level objects available for renaming.

```
rfs4000-229D58(config)#rename [TAB]
aaa_policy
address_range_alias
auto_provisioning_policy
bonjour_gw_forwarding_policy
bridging_policy
centro_policy
client_identity_group
crypto_cmp_policy
dhcp_server_policy
dns_whitelist
firewall_policy
host_alias
ip_snmp_acl
ipv6_radv_policy
mac_acl
meshpoint
mint_policy
mac_list
network_group_alias
passpoint_policy
radio_qos
radius_server_policy
rf_domain
roaming_assist_policy
routing_policy
smart_rf_policy
subscriber_policy
url_list
wips_policy
wlan_qos
device
```

```
rfs4000-229D58(config)#
```
The following examples first clones the existing IP access list BROADCAST-MULTICAST-CONTROL, and then renames the cloned IP access list:

```
rfs4000-229D58(config)#show context
!
! Configuration of RFS4000 version 5.8.4.0-004D
!
!
version 2.5
!
client-identity TestClientIdentity
dhcp 1 message-type request option-codes exact hexstring 5e4d36780b3a7f
!
client-identity-group ClientIdentityGroup
client-identity TestClientIdentity precedence 1
!
ip access-list BROADCAST-MULTICAST-CONTROL
permit tcp any any rule-precedence 10 rule-description "permit all TCP traffic"
permit udp any eq 67 any eq dhcpc rule-precedence 11 rule-description "permit DHCP replies"
deny udp any range 137 138 any range 137 138 rule-precedence 20 rule-description "deny windows netbios"
deny ip any 224.0.0.0/4 rule-precedence 21 rule-description "deny IP multicast"
deny ip any host 255.255.255.255 rule-precedence 22 rule-description "deny IP local broadcast"
permit ip any any rule-precedence 100 rule-description "permit all IP traffic"
!
mac access-list PERMIT-ARP-AND-IPv4
permit any any type ip rule-precedence 10 rule-description "permit all IPv4 traffic"
--More--
rfs4000-229D58(config)
```

```
rfs4000-229D58(config)#clone ip_acl BROADCAST-MULTICAST-CONTROL TestIP_CLONED
rfs4000-229D58(config)#commit
```

```
rfs4000-229D58(config)#show context
!
! Configuration of RFS4000 version 5.8.4.0-004D
!
!
version 2.5
!
client-identity TestClientIdentity
dhcp 1 message-type request option-codes exact hexstring 5e4d36780b3a7f
!
client-identity-group ClientIdentityGroup
client-identity TestClientIdentity precedence 1
!
ip access-list BROADCAST-MULTICAST-CONTROL
permit tcp any any rule-precedence 10 rule-description "permit all TCP traffic"
permit udp any eq 67 any eq dhcpc rule-precedence 11 rule-description "permit DHCP replies"
deny udp any range 137 138 any range 137 138 rule-precedence 20 rule-description "deny windows netbios"
deny ip any 224.0.0.0/4 rule-precedence 21 rule-description "deny IP multicast"
deny ip any host 255.255.255.255 rule-precedence 22 rule-description "deny IP local broadcast"
permit ip any any rule-precedence 100 rule-description "permit all IP traffic"
!
ip access-list TestIP_CLONED
permit tcp any any rule-precedence 10 rule-description "permit all TCP traffic"
permit udp any eq 67 any eq dhcpc rule-precedence 11 rule-description "permit DHCP replies"
--More--
rfs4000-229D58(config)#
rfs4000-229D58(config)#rename ip_acl TestIP_CLONED TestIP_RENAMED
rfs4000-229D58(config)#commit
rfs4000-229D58(config)#show context
!
! Configuration of RFS4000 version 5.8.4.0-004D
!
!
version 2.5
!
!
client-identity TestClientIdentity
dhcp 1 message-type request option-codes exact hexstring 5e4d36780b3a7f
!
client-identity-group ClientIdentityGroup
client-identity TestClientIdentity precedence 1
!
ip access-list BROADCAST-MULTICAST-CONTROL
  permit tcp any any rule-precedence 10 rule-description "permit all TCP traffic"
  permit udp any eq 67 any eq dhcpc rule-precedence 11 rule-description "permit DHCP replies"
  deny udp any range 137 138 any range 137 138 rule-precedence 20 rule-description "deny windows netbios"
  deny ip any 224.0.0.0/4 rule-precedence 21 rule-description "deny IP multicast"
  deny ip any host 255.255.255.255 rule-precedence 22 rule-description "deny IP local broadcast"
  permit ip any any rule-precedence 100 rule-description "permit all IP traffic"
!
ip access-list TestIP_RENAMED
  permit tcp any any rule-precedence 10 rule-description "permit all TCP traffic"
  permit udp any eq 67 any eq dhcpc rule-precedence 11 rule-description "permit DHCP replies"
--More--
rfs4000-229D58(config)#

**Related Commands**

| clone           | Creates a replica of an existing TLO or device |
4.1.76 rf-domain

Global Configuration Commands

An RF Domain groups devices that can logically belong to one network.

The following table lists the RF Domain configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>rf-domain</td>
<td>Creates a RF Domain policy and enters its configuration mode</td>
<td>page 4-327</td>
</tr>
<tr>
<td>rf-domain-mode commands</td>
<td>Invokes RF Domain configuration mode commands</td>
<td>page 4-330</td>
</tr>
</tbody>
</table>
4.1.76.1 rf-domain

rf-domain

Creates an RF Domain or enters the RF Domain configuration context for one or more RF Domains. If the RF Domain does not exist, it is created.

The configuration of controllers (wireless controllers, service platforms, and access points) comprises of RF Domains that define regulatory, location, and other relevant policies. At least one default RF Domain is assigned to each controller.

RF Domains allow administrators to assign configuration data to multiple devices deployed in a common coverage area, such as in a floor, building, or site. Each RF Domain contains policies that set the Smart RF or WIPS configuration.

RF Domains also enable administrators to override WLAN SSID name and VLAN assignments. This enables the deployment of a global WLAN across multiple sites and unique SSID name or VLAN assignments to groups of access points servicing the global WLAN. This WLAN override eliminates the need to define and manage a large number of individual WLANs and profiles.

A controller’s configuration contains:

- A default RF Domain - Each controller utilizes a default RF Domain. Access Points are assigned to this default RF Domain as they are discovered by the controller. A default RF Domain can be used for single-site and multi-site deployments.
  - Single-site deployment – The default RF Domain can be used for single site deployments, where regional, regulatory, and RF policies are common between devices.
  - Multi-site deployment – A default RF Domain can omit configuration parameters to prohibit regulatory configuration from automatically being inherited by devices as they are discovered. This is desirable in multi-site deployments with devices spanning multiple countries. Omitting specific configuration parameters eliminates the risk of an incorrect country code from being automatically assigned to a device.

- A user-defined RF Domain - Created by administrators. A user-defined RF Domain can be assigned to multiple devices manually or automatically.
  - Manually assigned – Use the CLI or UI to manually assign a user-defined RF Domain to controllers and service platforms.
  - Automatically assigned – Use a AP provisioning policy to automatically assign specific RF Domains to access points based on the access point’s model, serial number, VLAN, DHCP option, and IP address or MAC address. Automatic RF Domain assignments are useful in large deployments, as they enable plug-n-play access point deployments by automatically applying RF Domains to remote access points. For more information on auto provisioning policy, see Chapter 9, AUTO-PROVISIONING-POLICY.

Configure and deploy user-defined RF Domains for single or multiple sites where devices require unique regulatory and regional configurations, or unique Smart RF and WIPS policies. User-defined RF Domains can be used to:

- Assign unique Smart RF or WIPS policies to access points deployed on different floors or buildings within a site.
- Assign unique regional or regulatory configurations to devices deployed in different states or countries.
- Assign unique WLAN SSIDs and/or VLAN IDs to sites assigned a common WLAN without having to define individual WLANs for each site.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600
**Syntax**

rf-domain {<RF-DOMAIN-NAME>|containing <RF-DOMAIN-NAME>}

**Parameters**

- rf-domain {<RF-DOMAIN-NAME>|containing <RF-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>rf-domain</th>
<th>Creates a new RF Domain or enters its configuration context</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;RF-DOMAIN-NAME&gt;</td>
<td>Optional. Specify the RF Domain name (should not exceed 32 characters and should represent the intended purpose). Once created, the name cannot be edited.</td>
</tr>
<tr>
<td>containing &lt;RF-DOMAIN-NAME&gt;</td>
<td>Optional. Identifies an existing RF Domain that contains a specified sub-string in the domain name</td>
</tr>
</tbody>
</table>

- <RF-DOMAIN-NAME> – Specify a sub-string of the RF Domain name.

**Examples**

rfs7000-37FABE(config)#rf-domain rfs7000
rfs7000-37FABE(config-rf-domain-rfs7000)#?

RF Domain Mode commands:

- adoption-mode Configure the adoption mode for the access-points in this RF-Domain
- alias Alias
- channel-list Configure channel list to be advertised to wireless clients
- contact Configure the contact
- control-vlan VLAN for control traffic on this RF Domain
- controller-managed RF Domain manager for this domain will be an adopting controller
- country-code Configure the country of operation
- layout Configure layout
- location Configure the location
- mac-name Configure MAC address to name mappings
- no Negate a command or set its defaults
- override-smartrf Configured RF Domain level overrides for smart-rf
- override-wlan Configured RF Domain level overrides for wlan
- sensor-server AirDefense sensor server configuration
- stats Configure the stats related setting
- timezone Configure the timezone
- tree-node Configure tree node under which this rf-domain appears
- use Set setting to use
- clrscr Clears the display screen
- commit Commit all changes made in this session
- do Run commands from Exec mode
- end End current mode and change to EXEC mode
- exit End current mode and down to previous mode
- help Description of the interactive help system
- revert Revert changes
- service Service Commands
- show Show running system information
- write Write running configuration to memory or terminal

rfs7000-37FABE(config-rf-domain-rfs7000)#

nxa9500-6C8809(config-rf-domain-test)#?

RF Domain Mode commands:

- adoption-mode Configure the adoption mode for the access-points in this RF-Domain
- alias Alias
- channel-list Configure channel list to be advertised to wireless clients
- contact Configure the contact
- control-vlan VLAN for control traffic on this RF Domain
- controller-managed RF Domain manager for this domain will be an adopting controller
- country-code Configure the country of operation
- layout Configure layout
- location Configure the location
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mac-name</td>
<td>Configure MAC address to name mappings</td>
</tr>
<tr>
<td>mpact-server</td>
<td>MPACT server configuration</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>override-smartrf</td>
<td>Configured RF Domain level overrides for smart-rf</td>
</tr>
<tr>
<td>override-wlan</td>
<td>Configure RF Domain level overrides for wlan</td>
</tr>
<tr>
<td>sensor-server</td>
<td>AirDefense sensor server configuration</td>
</tr>
<tr>
<td>stats</td>
<td>Configure the stats related setting</td>
</tr>
<tr>
<td>timezone</td>
<td>Configure the timezone</td>
</tr>
<tr>
<td>tree-node</td>
<td>Configure tree node under which this rf-domain appears</td>
</tr>
<tr>
<td>use</td>
<td>Set setting to use</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
</tr>
</tbody>
</table>
4.1.76.2 rf-domain-mode commands

This section describes the default commands under RF Domain.

The following table summarizes RF Domain configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>adoption-mode</td>
<td>Configures the mode of adoption of access points in the selected RF Domain</td>
<td>page 4-331</td>
</tr>
<tr>
<td>alias</td>
<td>Configures network, VLAN, and service aliases at the RF Domain level</td>
<td>page 4-333</td>
</tr>
<tr>
<td>channel-list</td>
<td>Configures the channel list advertised by radios</td>
<td>page 4-339</td>
</tr>
<tr>
<td>contact</td>
<td>Configures network administrator’s contact information (needed in case of any problems impacting the RF Domain)</td>
<td>page 4-340</td>
</tr>
<tr>
<td>control-vlan</td>
<td>Configures VLAN for traffic control on a RF Domain</td>
<td>page 4-341</td>
</tr>
<tr>
<td>controller-managed</td>
<td>Configures the adopting controller or service platform as this RF Domain’s manager</td>
<td>page 4-342</td>
</tr>
<tr>
<td>country-code</td>
<td>Configures the country of operation</td>
<td>page 4-343</td>
</tr>
<tr>
<td>layout</td>
<td>Configures layout information</td>
<td>page 4-344</td>
</tr>
<tr>
<td>location</td>
<td>Configures the physical location of a RF Domain</td>
<td>page 4-346</td>
</tr>
<tr>
<td>mac-name</td>
<td>Maps MAC addresses to names</td>
<td>page 4-347</td>
</tr>
<tr>
<td>mpact-server</td>
<td>Configures an MPact server on the selected RF Domain. This command is supported only on the NX95XX series service platforms.</td>
<td>page 4-348</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts configured settings to their default</td>
<td>page 4-349</td>
</tr>
<tr>
<td>override-smart-rf</td>
<td>Configures RF Domain level overrides for Smart RF</td>
<td>page 4-351</td>
</tr>
<tr>
<td>override-wlan</td>
<td>Configures RF Domain level overrides for a WLAN</td>
<td>page 4-352</td>
</tr>
<tr>
<td>sensor-server</td>
<td>Configures an AirDefense sensor server on this RF Domain</td>
<td>page 4-354</td>
</tr>
<tr>
<td>stats</td>
<td>Configures stats related settings on this RF Domain. These settings define how RF Domain statistics are updated.</td>
<td>page 4-356</td>
</tr>
<tr>
<td>timezone</td>
<td>Configures a RF Domain’s geographic time zone</td>
<td>page 4-357</td>
</tr>
<tr>
<td>tree-node</td>
<td>Configures the hierarchical (tree-node) structure under which this RF Domain appears</td>
<td>page 4-358</td>
</tr>
<tr>
<td>use</td>
<td>Enables the use of a specified Smart RF and/or WIPS policy</td>
<td>page 4-360</td>
</tr>
</tbody>
</table>
4.1.76.2.1 adoption-mode

rf-domain-mode commands

Configures the mode of adoption of access points in the selected RF Domain

By default, controllers or virtual controllers (VCs) on being powered-up automatically move to the Controller/VC mode and do not attempt adoption to the CLOUD or local controller. On the other hand, a non-vc access point (AP), on being powered-up for the first time, starts the following auto-discovery process:

1. Moves to MLCP_DISCOVERY state and tries to discover a local controller. If a local controller is found, it
   a. adopts to the controller, and
   b. marks itself as “local-controller” adopted, and
   c. moves to the MLCP_MODE
2. If a local controller is not found, the AP switches to the CLOUD_DISCOVERY state, and tries connecting to the Cloud. If the AP succeeds in connecting to the cloud, it
   a. marks itself as “cloud-adopted”, and
   b. moves to the CLOUD_MODE.
3. If the AP fails to adopt either to a local controller or the Cloud, it switches between MLCP_DISCOVERY and CLOUD_DISCOVERY states until adopted.
4. Once adopted, an AP’s adoption mode does not change unless,
   a. It is changed from the controller’s CLI (using the adoption-mode command) or from the Cloud dashboard, or
   b. If the AP is reverted to factory settings, in which case the AP starts the auto-discovery process on bootup.

Supported in the following platforms:

- Access Points – AP7502, AP7522, AP7532, AP7562
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

adoption-mode [cloud|controller]

Parameters

- adoption-mode [cloud|controller]

adoption-mode [cloud|controller] Configures the mode of adoption of access points in the selected RF Domain as ‘cloud’ or ‘controller’

- cloud – Sets the mode of adoption as cloud. Note, APs with the controller host configuration specified are marked as local-controller APs and never try adopting to the CLOUD.
- controller – Sets the mode of adoption as controller. This is the default setting.

Note: Use this command to migrate all access points, within the RF Domain, from the controller to the cloud or vice versa. Also, use it to prevent cloud-enabled APs (AP7502, AP7522, AP7532, AP7562), deployed at an enterprise customer site, from adopting to the Cloud and exposing AP details.

Examples

nx9500-6C8809(config-rf-domain-test)#adoption-mode cloud

nx9500-6C8809(config-rf-domain-test)#show context
rf-domain test
adoption-mode cloud
no country-code
nx9500-6C8809(config-rf-domain-test20)#
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Reverts the adoption mode to default (controller)</td>
</tr>
</tbody>
</table>
### 4.1.76.2.2 alias

#### rf-domain-mode commands

Configures network, VLAN, host, string, and network-service aliases at the RF Domain level.

This command also allows you to associate existing aliases, created in the global configuration mode, and apply overrides to customize for use at the domain level.

For information on aliases, see `alias`.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
alias [address-range|host|network|network-group|network-service|number|string|vlan]

alias address-range <ADDRESS-RANGE-ALIAS-NAME> <STARTING-IP> to <ENDING-IP>

alias host <HOST-ALIAS-NAME> <HOST-IP>

alias network <NETWORK-ALIAS-NAME> <NETWORK-ADDRESS/MASK>

alias network-group <NETWORK-GROUP-ALIAS-NAME> [address-range|host|network]

alias network-group <NETWORK-GROUP-ALIAS-NAME> [address-range <STARTING-IP> to <ENDING-IP>]

alias network-service <NETWORK-SERVICE-ALIAS-NAME> proto [0-254]|<WORD>|eigrp|gre|igmp|igp|ospf|vrrp]

alias number <NUMBER-ALIAS-NAME> <0-4294967295>

alias network-service <NETWORK-SERVICE-ALIAS-NAME> proto [0-254]|<WORD>|eigrp|gre|igmp|igp|ospf|vrrp]

alias string <STRING-ALIAS-NAME> <LINE>

alias vlan <VLAN-ALIAS-NAME> <1-4094>
```

**Parameters**

- **address-range** 
  - `<ADDRESS-RANGE-ALIAS-NAME>`
  - `<STARTING-IP>` to `<ENDING-IP>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;ADDRESS-RANGE-ALIAS-NAME&gt;</code></td>
<td>Creates a new address-range alias for this RF Domain. Or associates an existing address-range alias with this RF Domain. An address-range alias maps a name to a range of IP addresses.</td>
</tr>
<tr>
<td><code>&lt;STARTING-IP&gt;</code> to <code>&lt;ENDING-IP&gt;</code></td>
<td>Associates a range of IP addresses with this address range alias</td>
</tr>
<tr>
<td>Note</td>
<td>Alias name should begin with <code>$</code>.</td>
</tr>
</tbody>
</table>

Note: If using an existing address-range alias, you can apply overrides to the alias at the RF Domain level.
### alias host <HOST-ALIAS-NAME> <HOST-IP>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>host &lt;HOST-ALIAS-NAME&gt;</td>
<td>Creates a host alias for this RF Domain. Or associates an existing host alias with this RF Domain. A host alias maps a name to a single network host.</td>
</tr>
<tr>
<td></td>
<td>• &lt;HOST-ALIAS-NAME&gt; – Specify the host alias name.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Alias name should begin with <code>$</code>.</td>
</tr>
<tr>
<td>&lt;HOST-IP&gt;</td>
<td>Associates the network host’s IP address with this host alias</td>
</tr>
<tr>
<td></td>
<td>• &lt;HOST-IP&gt; – Specify the network host’s IP address.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> If using an existing host alias, you can apply overrides to the alias at the RF Domain level.</td>
</tr>
</tbody>
</table>

### alias network <NETWORK-ALIAS-NAME> <NETWORK-ADDRESS/MASK>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>network &lt;NETWORK-ALIAS-NAME&gt;</td>
<td>Creates a network alias for this RF Domain. Or associates an existing network alias with this RF Domain. A network alias maps a name to a single network address.</td>
</tr>
<tr>
<td></td>
<td>• &lt;NETWORK-ALIAS-NAME&gt; – Specify the network alias name.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Alias name should begin with <code>$</code>.</td>
</tr>
<tr>
<td>&lt;NETWORK-ADDRESS/MASK&gt;</td>
<td>Associates a single network with this network alias</td>
</tr>
<tr>
<td></td>
<td>• &lt;NETWORK-ADDRESS/MASK&gt; – Specify the network’s address and mask.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> If using an existing network alias, you can apply overrides to the alias at the RF Domain level.</td>
</tr>
</tbody>
</table>

### alias network-group <NETWORK-GROUP-ALIAS-NAME> [address-range <STARTING-IP> to <ENDING-IP> {<STARTING-IP> to <ENDING-IP>}|host <HOST-IP> {<HOST-IP>}|network <NETWORK-ADDRESS/MASK> {<NETWORK-ADDRESS/MASK>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>network-group &lt;NETWORK-GROUP-ALIAS-NAME&gt;</td>
<td>Creates a network-group alias for this RF Domain. Or associates an existing network-group alias with this RF Domain.</td>
</tr>
<tr>
<td></td>
<td>• &lt;NETWORK-GROUP-ALIAS-NAME&gt; – Specify the network-group alias name.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Alias name should begin with <code>$</code>.</td>
</tr>
<tr>
<td></td>
<td>After specifying the name, specify the following: a range of IP addresses, host addresses, or a range of network addresses.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> If using an existing network-group alias, you can apply overrides to the alias at the RF Domain level.</td>
</tr>
</tbody>
</table>

### address-range <STARTING-IP> to <ENDING-IP> {<STARTING-IP> to <ENDING-IP>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Associates a range of IP addresses with this network-group alias</td>
</tr>
<tr>
<td></td>
<td>• &lt;STARTING-IP&gt; – Specify the first IP address in the range.</td>
</tr>
<tr>
<td></td>
<td>• to &lt;ENDING-IP&gt; – Specify the last IP address in the range.</td>
</tr>
<tr>
<td></td>
<td>• &lt;STARTING-IP&gt; to &lt;ENDING-IP&gt; – Optional. Specifies more than one range of IP addresses. A maximum of eight (8) IP address ranges can be configured.</td>
</tr>
</tbody>
</table>

### host <HOST-IP> {<HOST-IP>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Associates a single or multiple hosts with this network-group alias</td>
</tr>
<tr>
<td></td>
<td>• &lt;HOST-IP&gt; – Specify the hosts’ IP address.</td>
</tr>
<tr>
<td></td>
<td>• &lt;HOST-IP&gt; – Optional. Specifies more than one host. A maximum of eight (8) hosts can be configured.</td>
</tr>
</tbody>
</table>

### network <NETWORK-ADDRESS/MASK> {<NETWORK-ADDRESS/MASK>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Associates a single or multiple networks with this network-group alias</td>
</tr>
<tr>
<td></td>
<td>• &lt;NETWORK-ADDRESS/MASK&gt; – Specify the network’s address and mask.</td>
</tr>
<tr>
<td></td>
<td>• &lt;NETWORK-ADDRESS/MASK&gt; – Optional. Specifies more than one network. A maximum of eight (8) networks can be configured.</td>
</tr>
</tbody>
</table>

**Create a network-service alias for this RF Domain.** Or associates an existing network-service alias with this RF Domain. A network-service alias maps a name to network services and the corresponding source and destination software ports.

- `<NETWORK-SERVICE-ALIAS-NAME>` – Specify a network-service alias name.

**Note:** Alias name should begin with `$`.  
**Note:** If using an existing network-service alias, you can apply overrides to the alias at the RF Domain level.

**proto [<0-254>|<WORD>|eigrp|gre|igmp|igp|ospf|vrrp]**

Use one of the following options to associate an Internet protocol with this network-service alias:

- `<0-254>` – Identifies the protocol by its number. Specify the protocol number from 0 - 254. This is the number by which the protocol is identified in the *Protocol* field of the IPv4 header and the *Next Header* field of IPv6 header. For example, the User Datagram Protocol's (UDP) designated number is 17.
- `<WORD>` – Identifies the protocol by its name. Specify the protocol name.
  - `gre` – Selects *Generic Routing Encapsulation* (GRE). The protocol number is 47.
  - `ospf` – Selects *Open Shortest Path First* (OSPF). The protocol number is 89.
  - `vrrp` – Selects *Virtual Router Redundancy Protocol* (VRRP). The protocol number is 112.

**{(<1-65535>|<WORD>|bgp|dns|ftp|ftp-data|gopher|https|ldap|ntp|ntp|poll|proto|sip|smtp|sourceport [<1-65535>|<WORD>]|ssh|telnet|tftp|www})**

After specifying the protocol, you may configure a destination port for this service. These keywords are recursive and you can configure multiple protocols and associate multiple destination and source ports.

- `<1-65535>` – Optional. Configures a destination port number from 1 - 65535
- `<WORD>` – Optional. Identifies the destination port by the service name provided. For example, the *secure shell* (SSH) service uses TCP port 22.
  - `bgp` – Optional. Configures the default *Border Gateway Protocol* (BGP) services port (179)
  - `dns` – Optional. Configures the default *Domain Name System* (DNS) services port (53)
  - `ftp` – Optional. Configures the default *File Transfer Protocol* (FTP) control services port (21)
  - `ftp-data` – Optional. Configures the default FTP data services port (20)
  - `gopher` – Optional. Configures the default gopher services port (70)
  - `https` – Optional. Configures the default HTTPS services port (443)
  - `ntp` – Optional. Configures the default Newsgroup (NNTP) services port (119)

Contd..
### alias number <NUMBER-ALIAS-NAME> <0-4294967295>

**Description:** Creates a new number alias or applies an existing number, identified by the <NUMBER-ALIAS-NAME> keyword.

- `<NUMBER-ALIAS-NAME>` – Specify the number alias name.
- `<0-4294967295>` – Specify the number, from 0 - 4294967295, assigned to the number alias created.

**Note:** Number aliases map a name to a numeric value. For example, `alias number $NUMBER 100`.
- The number alias name is: $NUMBER
- The value assigned is: 100
- The value referenced by alias $NUMBER, wherever used, is 100.

### alias string <STRING-ALIAS-NAME> <LINE>

**Description:** Creates a string alias for this RF Domain. Or associates an existing string alias with this RF Domain. String aliases map a name to an arbitrary string value. For example, `alias string $DOMAIN test.example_company.com`.

- `<STRING-ALIAS-NAME>` – Specify the string alias name.
- `<LINE>` – Specify the string value.

**Note:** Alias name should begin with `$`.
**Note:** If using an existing string alias, you can apply overrides to the alias at the RF Domain level.

### alias vlan <VLAN-ALIAS-NAME> <1-4094>

**Description:** Creates a VLAN alias for this RF Domain. Or associates an existing VLAN alias with this RF Domain. A VLAN alias maps a name to a VLAN ID.

- `<VLAN-ALIAS-NAME>` – Specify the VLAN alias name.

**Note:** Alias name should begin with `$`.
GLOBAL CONFIGURATION COMMANDS 4-337

<table>
<thead>
<tr>
<th>Example</th>
<th>Maps the VLAN alias to a VLAN ID</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;1-4094&gt;</code></td>
<td>- Specify the VLAN ID from 1 - 4094.</td>
</tr>
<tr>
<td><strong>Note:</strong> If using an existing VLAN alias, you can apply overrides to the alias at the RF Domain level.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config)#show context
  ! Configuration of RFS4000 version 5.8.4.0-004D
  !
  version 2.5
  !
  alias network-group $TestNetGrpAlias network 192.168.13.0/24 192.168.16.0/24
  alias network-group $TestNetGrpAlias address-range 192.168.13.7 to 192.168.13.16 192.168.13.20 to 192.168.13.25
  !
  alias network $TestNetworkAlias 192.168.13.0/24
  !
  alias host $TestHostAlias 192.168.13.10
  !
  alias address-range $TestAddRanAlias 192.168.13.10 to 192.168.13.13
  !
  alias network-service $NetworkServAlias proto udp
  !
  alias network-service $kerberos proto tcp 749 750 80
  alias network-service $kerberos proto udp 68 sourceport 67
  !
  alias vlan $TestVLANAlias 1
  --More--
  rfs4000-229D58(config)#
```

In the following examples, the global aliases `$kerberos` and `$TestVLANAlias` are associated with the RF Domain 'test' and overrides applied:

```
rfs4000-229D58(config-rf-domain-test)#alias network-service $kerberos proto tcp 749 750 80
rfs4000-229D58(config-rf-domain-test)#alias vlan $TestVLANAlias 10
```

```
rfs4000-229D58(config-rf-domain-test)#show context
rf-domain test
  no country-code
  alias network-service $kerberos proto tcp 749 750 80
  alias vlan $TestVLANAlias 10
rfs4000-229D58(config-rf-domain-test)#
```

```
x9500-6C8809(config-rf-domain-test)#alias string $test example_company.com
```

```
x9500-6C8809(config-rf-domain-test)#show context
rf-domain test
  no country-code
  alias string $test example_company.com
x9500-6C8809(config-rf-domain-test)#
```

**Example 1:**

In the following examples, the network-group alias `$test` is configured to include hosts 192.168.1.10 and 192.168.1.11, networks 192.168.2.0/24 and 192.168.3.0/24 and address-range 192.168.4.10 to 192.168.4.20.

```
rfs4000-229D58(config)#alias network-group $test host 192.168.1.10 192.168.1.11
rfs4000-229D58(config)#alias network-group $test network 192.168.2.0/24 192.168.3.0/24
rfs4000-229D58(config)#alias network-group $test address-range 192.168.4.10 to 192.168.4.20
```
Associate this network-group alias \'$test\' to the RF Domain \'test\' and override the \'host\' element of the alias.

```
n-rfs4000-229D58(config-rf-domain-test)#alias network-group \$test host 192.168.10.10
n-rfs4000-229D58(config-rf-domain-test)#show context
rf-domain test
  no country-code
  alias network-service $kerberos proto tcp 749 750 80
    alias network-group $test host 192.168.10.10
    alias network-group $test network 192.168.2.0/24 192.168.3.0/24
    alias network-group $test address-range 192.168.4.10 to 192.168.4.20
  alias vlan $TestVLANAlias 10
n-rfs4000-229D58(config-rf-domain-test)#
```

In the preceding example, the \'host\' element of the network-group alias \'$test\' has been overridden. But the \'network\' and \'address-range\' elements have been retained as is.

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a network, network-group, network-service, VLAN, or string alias from this RF Domain</td>
</tr>
</tbody>
</table>
4.1.76.2.3 channel-list

rf-domain-mode commands

Configures the channel list advertised by radios. This command also enables a dynamic update of a channel list. Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

channel-list [2.4GHz|5GHz|dynamic]

channel-list dynamic

channel-list [2.4GHz|5GHz] <CHANNEL-LIST>

Parameters

- channel-list dynamic

  - dynamic Enables a dynamic update of a channel list

  - channel-list [2.4GHz|5GHz] <CHANNEL-LIST>

2.4GHz

<CHANNEL-LIST>

Configures the channel list advertised by radios operating in the 2.4 GHz mode

  • <CHANNEL-LIST> – Specify the list of channels separated by commas or hyphens.

5GHz

<CHANNEL-LIST>

Configures the channel list advertised by radios operating in the 5.0 GHz mode

  • <CHANNEL-LIST> – Specify the list of channels separated by commas or hyphens.

Examples

rfs7000-37FABE(config-rf-domain-default)#channel-list 2.4GHz 1-10

rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  no country-code
channel-list 2.4GHz 1,2,3,4,5,6,7,8,9,10
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

- no Removes the list of channels configured on the selected RF Domain for 2.4 GHz and 5.0 GHz bands. Also disables dynamic update of a channel list.
4.1.76.2.4 contact

rf-domain-mode commands

Configures the network administrator’s contact details. The network administrator is responsible for addressing problems impacting the network.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
contact <WORD>

Parameters

- contact <WORD>

Examples
rfs7000-37FABE(config-rf-domain-default)#contact Bob+14082778691

rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  contact Bob+14082778691
  channel-list 2.4GHz 1,2,3,4,5,6,7,8,9,10
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

- no
  Removes a network administrator’s contact details
### 4.1.76.2.5 control-vlan

*rf-domain-mode commands*

Configures the VLAN designated for traffic control in this RF Domain

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
control-vlan <1-4094>
```

**Parameters**

- `control-vlan <1-4094>`

  | `<1-4094>` | Specify the VLAN ID from 1 - 4094. The default is 1. |

**Examples**

```
rfs7000-37FABE(config-rf-domain-default)#control-vlan 1
```

```
rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  show context
  contact Bob+14082778691
  no country-code
  channel-list 2.4GHz 1,2,3,4,5,6,7,8,9,10
  control-vlan 1
```  

**Related Commands**

- `no` Disables the VLAN designated for controlling RF Domain traffic
4.1.76.2.6 controller-managed

rf-domain-mode commands

Configures the adopting controller (wireless controller, access point, or service platform) as this RF Domain’s manager. In other words, the RF Domain is controller managed, and the managing controller is the device managing the RF Domain.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

controller-managed

Parameters

None

Examples

rfs4000-229D58(config-rf-domain-test)#controller-managed
rfs4000-229D58(config-rf-domain-test)#commit

rfs4000-229D58(config-rf-domain-test)#show context
rf-domain test
  country-code in
controller-managed
  network-alias techPubs host 192.168.13.8
  network-alias techPubs address-range 192.168.13.10 to 192.168.13.15
  service-alias testing index 10 proto 9 destination-port range 21 21

rfs4000-229D58(config-rf-domain-test)#af

Related Commands

no

Removes the adopting controller or service platform as this RF Domain’s manager
4.1.76.2.7 country-code

rf-domain-mode commands

Configures a RF Domain’s country of operation. Since device channels transmit in specific channels unique to the country of operation, it is essential to configure the country code correctly or risk using illegal operation.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

country-code <WORD>

Parameters

- country-code <WORD>

Examples

rfs7000-37FABE(config-rf-domain-default)#country-code us

rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
contact Bob+14082778691
country-code us
channel-list 2.4GHz 1,2,3,4,5,6,7,8,9,10
control-vlan 1
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

- no

Removes the country of operation configured on a RF Domain
4.1.76.2.8 layout

rf-domain-mode commands

Configures the RF Domain layout in terms of area, floor, and location on a map. It allows users to place APs across the deployment map. A maximum of 256 layouts is permitted.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
layout [area|description|floor|map-location] {area|description|floor|map-location}

layout [area <AREA-NAME>|description <LINE>|floor <FLOOR-NAME>{<1-4094>}]|map-location <URL> units [feet|meters]{area <AREA-NAME>|description <LINE>|floor <FLOOR-NAME>{<1-4094>}|map-location <URL> units [feet|meters]}
```

Parameters

- **layout [area <AREA-NAME>|description <LINE>|floor <FLOOR-NAME>{<1-4094>}]|map-location <URL> units [feet|meters]{area <AREA-NAME>|description <LINE>|floor <FLOOR-NAME>{<1-4094>}|map-location <URL> units [feet|meters]}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>layout</td>
<td>Configures the RF Domain's layout in terms of area, floor, and location on a map. These are recursive parameters and you can configure one or all of these parameters.</td>
</tr>
<tr>
<td>area &lt;AREA-NAME&gt;</td>
<td>Configures the RF Domain's layout in terms of the area of location.</td>
</tr>
<tr>
<td></td>
<td>• &lt;AREA-NAME&gt; – Specify the area name.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> After configuring the RF Domain's area of functioning, optionally specify the floor name (and number), description, and/or the location on map.</td>
</tr>
<tr>
<td>description &lt;LINE&gt;</td>
<td>Configures a description for this RF Domain.</td>
</tr>
<tr>
<td></td>
<td>• &lt;LINE&gt; – Specify a description that enables you to identify the RF Domain. For a multi-worded string, use double quotes.</td>
</tr>
<tr>
<td>floor &lt;FLOOR-NAME&gt; &lt;1-4094&gt;</td>
<td>Configures the RF Domain's layout in terms of the floor name and number.</td>
</tr>
<tr>
<td></td>
<td>• &lt;FLOOR-NAME&gt; – Specify the floor name.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4094&gt; – Optional. Specifies the floor number from 1 - 4094. The default floor number is 1.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> After configuring the RF Domain's floor name (and number), optionally specify the area name, description, and/or the location on map.</td>
</tr>
<tr>
<td>map-location &lt;URL&gt; units [feet</td>
<td>meters]</td>
</tr>
<tr>
<td></td>
<td>• &lt;URL&gt; – Specify the URL to configure the map location.</td>
</tr>
<tr>
<td></td>
<td>• units [feet</td>
</tr>
<tr>
<td></td>
<td>• feet – Configures the map units in terms of feet</td>
</tr>
<tr>
<td></td>
<td>• meters – Configures the map units in terms of meter</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> After configuring the location of the RF Domain on the map, optionally specify the area name, floor name (and number), and/or description.</td>
</tr>
</tbody>
</table>
Examples

rfs7000-37FABE(config-rf-domain-default)#layout map-location www.firstfloor.com units meters area Ecospace floor Floor1

rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
contact Bob+14082778691
country-code us
channel-list 2.4GHz 1,2,3,4,5,6,7,8,9,10
layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
control-vlan 1
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the RF Domain layout details</td>
</tr>
</tbody>
</table>
4.1.76.2.9 location

rf-domain-mode commands

Configures the RF Domain’s physical location. The location could be as specific as the building name or floor number. Or it could be generic and include an entire site. The location defines the physical area where a set of devices with common configurations are deployed and managed by a RF Domain policy.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

location <WORD>

Parameters

- location <WORD>

Examples

rfs7000-37FABE(config-rf-domain-default)#location SanJose

rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  location SanJose
  contact Bob+14082778691
  country-code us
  channel-list 2.4GHz 1,2,3,4,5,6,7,8,9,10
  layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

- **no** Removes the RF Domain location
4.1.76.2.10 mac-name

rf-domain-mode commands

Configures a relevant name for each MAC address. Use this command to associate client names to specific connected client MAC addresses for improved client management.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
mac-name <MAC> <NAME>

Parameters
- mac-name <MAC> <NAME>

<table>
<thead>
<tr>
<th>mac-name &lt;MAC&gt; &lt;NAME&gt;</th>
<th>Assigns a user-friendly name to this RF Domain’s member access point’s connected client to assist in its easy recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MAC&gt; – Specify the MAC address</td>
<td></td>
</tr>
<tr>
<td>&lt;NAME&gt; – Specify the client name for the specified MAC address. The name specified here will be used in events and statistics.</td>
<td></td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-rf-domain-default)#mac-name 11-22-33-44-55-66 TestDevice

rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
location SanJose
contact Bob+14082778691
country-code us
channel-list 2.4GHz 1,2,3,4,5,6,7,8,9,10
mac-name 11-22-33-44-55-66 TestDevice
layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
control-vlan 1
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

no | Removes the MAC address to name mapping
4.1.76.2.11 mpact-server

rf-domain-mode commands

Configures an MPact server on the selected RF Domain

Within an MPact Appliance architecture, sensors scan for RSSI data at an administrator-defined interval and send to a dedicated MPact server resource, as opposed to an ADSP server. Use this command to configure the MPact server related parameters.

Supported in the following platforms:
  • Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

Syntax

mpact-server <1-3> ip <IP/HOSTNAME> \{port \[443|\<1-65535\>\]

Parameters

- mpact-server <1-3> ip <IP/HOSTNAME> \{port \[443|\<1-65535\>\]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| mpact-server <1-3> | Configures the MPact server parameters  
  • <1-3> – Select the server ID from 1 - 3. The server with the lowest defined ID is reached first. The default is 1. |
| ip | Configures the (non-DNS) IPv4 address of the MPact server  
  • <IP/HOSTNAME> – Specify the server’s IPv4 address/hostname. This is the IP address of the MPact server designated to receive RSSI scan data from a WiNG dedicated sensor. |
| port [443\<1-65535\>] | Optional. Configures the port where the MPact server is reachable. The options are:  
  • 443 – Configures port 443, the default port used by the MPact server. This is the default setting.  
  • <1-65535> – Specify a port for the MPact server port from 1 - 65535. |

Examples

nx9500-6C8809(config-rf-domain-test)#mpact-server 1 ip 192.168.13.20 port 200

nx9500-6C8809(config-rf-domain-test)#show context
rf-domain test
no country-code
mpact-server 1 ip 192.168.13.20 port 200
nx9500-6C8809(config-rf-domain-test)#

Related Commands

- no Removes the MPact server configurations
4.1.76.2.12 no

rf-domain-mode commands

Negates a command or reverts configured settings to their default. When used in the config RF Domain mode, the no command negates or reverts RF Domain settings.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [adoption-mode|alias|channel-list|contact|control-vlan|controller-managed|
country-code|layout|location|mac-name|mpact-server|override-smartrf|override-wlan|
sensor-server|stats|timezone|tree-node|use]

no [adoption-mode|channel-list [2.4GHz|5GHz|dynamic]|contact|control-vlan|
controller-managed|country-code|location|mac-name <MAC>|mpact-server <1-3>|
sensor-server <1-3>|stats update-interval|timezone|tree-node]

no alias [address-range|host|network|network-group [address-range|host|network]|network-service|number|string|vlan <ALIAS-NAME>

no layout {(area <AREA-NAME>|floor <FLOOR-NAME>)}

no override-smartrf channel-list [2.4GHz|5GHz]

no override-wlan <WLAN-NAME> [shutdown|ssid|vlan-pool [<1-4094>|all]|wepl28 [key <1-3>|transmit-key]|wpa-wpa2-psk]

no use [database-policy|license|nsight-policy|smart-rf-policy|wips-policy]

Parameters
- no <PARAMETERS>

no <PARAMETERS> Removes or reverts this RF Domain’s settings based on the parameters passed

Examples

The following example shows the default RF Domain settings before the ‘no’ commands are executed:

rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  location SanJose
  contact Bob+14082778691
  country-code us
  channel-list 2.4GHz 1,2,3,4,5,6,7,8,9,10
  mac-name 11-22-33-44-55-66 TestDevice
  layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
  control-vlan 1
rfs7000-37FABE(config-rf-domain-default)#

rfs7000-37FABE(config-rf-domain-default)#no channel-list 2.4GHz 1-10
rfs7000-37FABE(config-rf-domain-default)#no mac-name 11-22-33-44-55-66
rfs7000-37FABE(config-rf-domain-default)#no location
rfs7000-37FABE(config-rf-domain-default)#no control-vlan
The following example shows the default RF Domain settings after the ‘no’ commands are executed:

rfs7000-37FABE(config-rf-domain-default)#show context
  rf-domain default
  contact Bob+1408277691
  country-code us
  layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#
4.1.76.2.13 override-smart-rf

rf-domain-mode commands

Enables dynamic channel switching for Smart RF radios. This command allows you to configure an override list of channels that Smart RF can use for channel compensations on 2.4 GHz and 5.0 GHz radios.

When a radio fails or is faulty, a Smart RF policy provides automatic recovery by instructing neighboring access points to increase their transmit power to compensate for the coverage loss. Once correct access point placement has been established, Smart-RF can optionally be leveraged for automatic detector radio selection. Smart-RF uses detector radios to monitor RF events and can ensure availability of adequate detector coverage.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
override-smart-rf channel-list [2.4GHz|5GHZ] <CHANNEL-LIST>

Parameters

- override-smart-rf channel-list [2.4GHz|5GHZ] <CHANNEL-LIST>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>override-smartrf</td>
<td>Enables dynamic channel switching for Smart RF radios</td>
</tr>
<tr>
<td>channel-list</td>
<td>Configures a list of channels for 2.4 GHz and 5.0 GHz Smart RF radios</td>
</tr>
<tr>
<td>2.4GHz &lt;CHANNEL-LIST&gt;</td>
<td>Selects the 2.4 GHz Smart RF radio channels</td>
</tr>
<tr>
<td>5GHz &lt;CHANNEL-LIST&gt;</td>
<td>Selects the 5.0 GHz Smart RF radio channels</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-rf-domain-default)#override-smart-rf channel-list 2.4GHz 1,2,3

rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  contact Bob+14082778691
  country-code us
override-smart-rf channel-list 2.4GHz 1,2,3
layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

- **no** Removes the override-smartrf list of channels configured for 2.4 GHz and 5.0 GHz radios
4.1.76.2.14 override-wlan

- rf-domain-mode commands

Configures RF Domain level overrides for a WLAN

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

overrides-wlan <WLAN-NAME> [shutdown|ssid|vlan-pool|wep128|wpa-wpa2-psk]
overrides-wlan <WLAN-NAME> [shutdown|ssid <SSID>|vlan-pool <1-4094> {limit <0-8192>}] 
overrides-wlan <WLAN-NAME> wpa-wpa2-psk [0 <WORD>|2 <WORD>]
overrides-wlan <WLAN-NAME> wep128 [key <1-4> hex [0 <WORD>|2 <WORD>]|transmit-key <1-4>]

Parameters

- overrides-wlan <WLAN-NAME> [shutdown|ssid <SSID>|vlan-pool <1-4094> {limit <0-8192>}] 

| <WLAN-NAME> | Configures the WLAN name
|             | If applying RF Domain level overrides to an existing WLAN, specify its name. If creating a new WLAN, specify a name not exceeding 32 characters and representing the WLAN's coverage area. After creating the WLAN, configure its override parameters.

| shutdown | Shuts down WLAN operation on all mapped radios

| ssid <SSID> | Configures a override SSID associated with this WLAN
|            | • <SSID> – Specify the SSID (should not exceed 32 characters in length).
|            | Each WLAN provides associated wireless clients with a SSID. This has limitations, because it requires wireless clients to associate with different SSIDs to obtain QoS and security policies. However, a WiNG-managed RF Domain can have WLANs assigned and advertise a single SSID, and yet allow users to inherit different QoS or security policies.

| vlan-pool <1-4094> {limit <0-8192>} | Configures the override VLANs available to this WLAN
|                                         | • <1-4094> – Specify the VLAN ID from 1 - 4094.
|                                         | • limit <0-8192> – Optional. Sets a limit to the number of users on this VLAN from 0 - 8192. The default is 0.
|                                         | Controllers and service platforms allow the mapping of a WLAN to more than one VLAN. Wireless clients associating with a WLAN are assigned VLANs, from the pool representative of the WLAN, in a way that ensures proper load balancing across VLANs. Clients are tracked per VLAN, and assigned to the least used/loaded VLAN. Client VLAN usage is tracked on a per-WLAN basis. The maximum allowed client limit is 8192 per VLAN.

- overrides-wlan <WLAN-NAME> wpa-wpa2-psk [0 <WORD>|2 <WORD>]

| <WLAN-NAME> | Configures the WLAN name
|             | If applying RF Domain level overrides to an existing WLAN, specify its name. If creating a new WLAN, specify a name not exceeding 32 characters and representing the WLAN's coverage area. After creating the WLAN, configure its override parameters.
### GLOBAL CONFIGURATION COMMANDS

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| wpa-wpa2-psk <PASSPHRASE> | Overrides a WLAN's existing WPA-WPA2 pre-shared key or passphrase at the RF Domain level. WPA2 is a newer 802.11i standard that provides wireless security that is stronger than Wi-Fi Protected Access (WPA) and WEP.  
  - <PASSPHRASE> – Specify a WPA-WPA2 key or passphrase. It is an alphanumeric string of 8 to 64 ASCII characters or 64 HEX characters as the primary string, which both the transmitting and receiving authenticators must share in this new override PSK. The alphanumeric string allows character spaces. The string is converted to a numeric value. This passphrase saves you the necessity of entering the 256-bit key each time keys are generated. |
| overrides-wlan <WLAN-NAME> wep128 [key <1-4> hex [0 <WORD>|2 <WORD>]|transmit-key <1-4>] | Configures the WLAN name  
  If applying RF Domain level overrides to an existing WLAN, specify its name. If creating a new WLAN, specify a name not exceeding 32 characters and representing the WLAN’s coverage area. After creating the WLAN, configure its override parameters. |
| <WLAN-NAME> | Configures a WLAN’s existing WEP128 keys at the RF Domain level (not the profile level). WEP128 uses a 104 bit key, which is concatenated with a 24-bit initialization vector (IV) to form the RC4 traffic key. WEP may be all a small-business user needs for the simple encryption of wireless data on the WLAN. However, networks that require more security are at risk from a WEP flaw. WEP is only recommended if there are client devices incapable of using higher forms of security. The existing 802.11 standard alone offers administrators no effective method to update keys. |
| key <1-4> hex | Configures the WEP128 key. A total of four keys can be configured.  
  - <1-4> – Select the key index from 1-4.  
  - hex – Configures a hexadecimal key  
    - 0 <WORD> – Configures a clear text key  
    - 2 <WORD> – Configures an encrypted key  
  The following parameter is common to both clear-text and encrypted key options:  
  - <WORD> – Specify the WEP128/Keyguard key (should not exceed 26 hexadecimal characters in length). |
| transmit-key <1-4> | Configures transmit WEP/Keyguard key settings  
  - <1-4> – Transmit the key identified by the key index specified here. Specify the index from 1-4. |

### Examples

```
rfs7000-37FABE(config-rf-domain-default)#override-wlan test vlan-pool 2 limit 20
rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  contact Bob+14082778691
  country-code us
  override-smartrf channel-list 2.4GHz 1,2,3
  override-wlan test vlan-pool 2 limit 20
  layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets the override WLAN settings its default</td>
</tr>
</tbody>
</table>
4.1.76.2.15 sensor-server

Configures an AirDefense sensor server on this RF Domain. Sensor servers allow network administrators to monitor and download data from multiple sensors remote locations using Ethernet TCP/IP or serial communications. This enables administrators to respond quickly to interferences and coverage problems.

The Wireless Intrusion Protection System (WIPS) protects the controller managed network, wireless clients and access point radio traffic from attacks and unauthorized access. WIPS provides tools for standards compliance and around-the-clock wireless network security in a distributed environment. WIPS allows administrators to identify and accurately locate attacks, rogue devices and network vulnerabilities in real time and permits both a wired and wireless lockdown of wireless device connections upon acknowledgement of a threat.

In addition to dedicated AirDefense sensors, an access point radio can function as a sensor and upload information to a dedicated WIPS server (external to the controller). Unique WIPS server configurations can be used by RF Domains to ensure a WIPS server configuration is available to support the unique data protection needs of individual RF Domains.

WIPS is not supported on a WLAN basis, rather sensor functionality is supported on the access point radio(s) available to each controller managed WLAN. When an access point radio is functioning as a WIPS sensor, it is able to scan in sensor mode across all legal channels within the 2.4 and 5.0 GHz bands. Sensor support requires a AirDefense WIPS Server on the network. Sensor functionality is not provided by the access point alone. The access point works in conjunction with a dedicated WIPS server.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
sensor-server <1-3> ip <IP/HOSTNAME> {port [443|<1-65535>]} 
```

Parameters

- **sensor-server <1-3> ip <IP/HOSTNAME> {port [443|<1-65535>]}**

<table>
<thead>
<tr>
<th>sensor-server &lt;1-3&gt;</th>
<th>Configures an AirDefense sensor server parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-3&gt;</td>
<td>- Select the server ID from 1 - 3. The server with the lowest defined ID is reached first. The default is 1.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ip &lt;IP/HOSTNAME&gt;</th>
<th>Configures the (non DNS) IPv4 address of the sensor server</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP/HOSTNAME&gt;</td>
<td>- Specify the sensor server’s IPv4 address or hostname.</td>
</tr>
</tbody>
</table>

| port [443|<1-65535>] | Optional. Configures the sensor server port. The options are: |
|----------------|---------------------------------------------------------------|
| 443            | - Configures port 443, the default port used by the AirDefense server. This is the default setting. |
| <1-65535>      | - Allows you to select a WIPS/AirDefense sensor server port from 1 - 65535 |
Examples
rfs7000-37FABE(config-rf-domain-default)#sensor-server 2 ip 172.16.10.3 port 443
rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  contact Bob+14082778691
country-code us
  sensor-server 2 ip 172.16.10.3
  override-smartrf channel-list 2.4GHz 1,2,3
  override-wlan test vlan-pool 2 limit 20
  layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables an AirDefense sensor server parameters</td>
</tr>
</tbody>
</table>
4.1.76.2.16 stats

rf-domain-mode commands

Configures stats settings that define how RF Domain statistics are updated

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

stats update-interval

stats update-interval [<5-300>|auto]

Parameters

- stats update-interval [<5-300>|auto]

<table>
<thead>
<tr>
<th>stats update-interval</th>
<th>Configures the interval at which RF Domain statistics are updated. The options are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>[&lt;5-300&gt;</td>
<td>auto]</td>
</tr>
<tr>
<td></td>
<td>• auto – The RF Domain manager automatically adjusts the update interval based on the load.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-rf-domain-default)#stats update-interval 200
rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  contact Bob+14082778691
  stats update-interval 200
  country-code us
  sensor-server 2 ip 172.16.10.3
  override-smartrf channel-list 2.4GHz 1,2,3
  override-wlan test vlan-pool 2 limit 20
  layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

| no | Resets stats related settings |
4.1.76.2.17 timezone

rf-domain-mode commands

Configures the RF Domain’s geographic time zone. By default all WiNG devices are shipped with the time zone and time format set to Universal Time Coordinated (UTC) and 24-hour clock respectively. If the time zone is not reset, all devices within the RF Domain will display time relative to the UTC - Greenwich Time. Resetting the time zone is recommended, especially for RF Domains deployed across different geographical locations. The time zone can either be set on a specific device or on an RF Domain. When configured as RF Domain setting, it applies to all devices within the domain. For more information on configuring the time zone on a device, see timezone.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

timezone <TIMEZONE>

Parameters

- timezone <TIMEZONE>

Examples

rfs7000-37FABE(config-rf-domain-default)#timezone America/Los_Angeles

rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  contact Bob+14082778691
  timezone America/Los_Angeles
  stats update-interval 200
  country-code us
  sensor-server 2 ip 172.16.10.3
  override-smartrf channel-list 2.4GHz 1,2,3
  override-wlan test vlan-pool 2 limit 20
  layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#

The built-in WiNG timezones are:

nx9500-6C8809(config-rf-domain-test)#timezone <TAB>
Africa/  Asia/  Atlantic/  Australia/  CET  CST6CDT
EET  EST5EDT  Etc/  Europe/  MST7MDT  Pacific/
PST8PDT  US/  America/
nx9500-6C8809(config-rf-domain-test)#

Each of these time zones are further differentiated into sub time zones. For example, as shown in the following example:

nx9500-6C8809(config-rf-domain-test)#timezone Africa/
Africa/Cairo  Africa/Casablanca  Africa/Harare
Africa/Johannesburg  Africa/Lagos  Africa/Nairobi
nx9500-6C8809(config-rf-domain-test)#

Related Commands

no  Removes a RF Domain’s time zone
4.1.76.2.18 tree-node

rf-domain-mode commands

Configures the hierarchical (tree-node) structure under which this RF Domain is located

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

tree-node [campus|city|country|region] {(campus|city|country|region)}

Parameters
- tree-node [campus|city|country|region] {(campus|city|country|region)}

<table>
<thead>
<tr>
<th>tree-node</th>
<th>Configures the hierarchical tree structure defining the RF Domain's location. The tree node hierarchy can be configured in any order, but will always appear as: country &gt; region &gt; city &gt; campus. Further, a higher node, such as country, cannot be defined under a lower node, such as region. An RF Domain can be placed under any one of the tree nodes. But, an RF Domain at the country level may have all four nodes defined. Whereas, an RF Domain restricted to a campus, cannot have the country, city, and region nodes. Note: At least one of these four nodes must be defined. This feature is disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>campus</td>
<td>Configures the campus name for this RF Domain</td>
</tr>
<tr>
<td>city</td>
<td>Configures the city for this RF Domain</td>
</tr>
<tr>
<td>country</td>
<td>Configures the country for this RF Domain</td>
</tr>
<tr>
<td>region</td>
<td>Configures the region for this RF Domain</td>
</tr>
</tbody>
</table>

Usage Guidelines

The following points need to be taken into consideration when creating the tree-node structure:
- Adding a country first is a good idea since region, city, and campus can all be added as sub-nodes in the tree structure. However, the selected country is an invalid tree node until a RF Domain is mapped.
- A city and campus can be added in the tree structure as sub-nodes under a region. An RF Domain can be mapped anywhere down the hierarchy for a region and not just directly under a country. For example, a region can have city, campus, and one RF Domain mapped.
- Only a campus can be added as a sub-node under a city. The city is an invalid tree node until a RF Domain is mapped somewhere within the directory tree.
- A campus is the last node in the hierarchy before a RF Domain, and it is not valid unless it has a RF Domain mapped.
- After creating the tree structure do a commit and save for the tree configuration to take effect and persist across reboots.
Examples
rfs4000-229D58(config-rf-domain-test)#tree-node campus EcoSpace City Bangalore country India region South
rfs4000-229D58(config-rf-domain-test)#
rfs4000-229D58(config-rf-domain-test)#show context
rf-domain test
country-code in
tree-node country India region South city Bangalore campus EcoSpace
rfs4000-229D58(config-rf-domain-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the RF Domain's tree-node configuration</td>
</tr>
</tbody>
</table>
4.1.76.2.19 use

rf-domain-mode commands

Associates the following with an RF Domain: database policy, NSight policy, sensor policy, Smart RF policy, WIPS policy, RTL server policy, and Web filtering license.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

use [database-policy|license|nsight-policy|rtl-server-policy|sensor-policy|smart-rf-policy|wips-policy]


Parameters


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>use</td>
<td>Associates the following policies with the RF Domain: database policy, NSight policy, sensor policy, Smart RF policy, WIPS policy. It also applies a Web filtering license to the selected RF Domain.</td>
</tr>
<tr>
<td>database-policy &lt;DATABASE-POLICY-NAME&gt;</td>
<td>Associates a database policy with the selected RF Domain</td>
</tr>
<tr>
<td>license &lt;WEB-FILTERING-LICENSE&gt;</td>
<td>Obtains the specified Web filtering license from the adopting controller</td>
</tr>
<tr>
<td>nsight-policy &lt;NSIGHT-POLICY-NAME&gt;</td>
<td>Associates an NSight policy to this RF Domain</td>
</tr>
<tr>
<td>rtl-server-policy &lt;RTL-SERVER-POLICY-NAME&gt;</td>
<td>Associates a Real Time Locationing (RTL) server policy with the selected RF Domain</td>
</tr>
<tr>
<td>sensor-policy &lt;SENSOR-POLICY-NAME&gt;</td>
<td>Associates a sensor policy with the selected RF Domain</td>
</tr>
</tbody>
</table>
### smart-rf-policy
**<SMART-RF-POLICY-NAME>**
Associates a Smart RF policy. When associated, the Smart RF policy provides automatic recovery from coverage loss (due to failed or faulty radio) by instructing neighboring access points to increase their transmit power.
Once correct access point placement has been established, Smart-RF can optionally be leveraged for automatic detector radio selection. Smart-RF uses detector radios to monitor RF events to ensure availability of adequate detector coverage.
- **<SMART-RF-POLICY-NAME>** – Specify the Smart RF policy name (should be existing and configured). For more information on configuring smart RF policy, see SMART-RF-POLICY.

### wips-policy
**<WIPS-POLICY-NAME>**
Associates a WIPS policy. A WIPS policy provides protection against wireless threats and acts as a key layer of security complementing wireless VPNs, encryption and authentication. A WIPS policy uses a dedicated sensor for actively detecting and locating rogue AP devices. After detection, WIPS uses mitigation techniques to block the devices by manual termination, air lockdown, or port suppression.
- **<WIPS-POLICY-NAME>** – Specify the WIPS policy name (should be existing and configured). For more information on configuring WIPS policy, see WIPS-POLICY.

### Examples
```
rfs7000-37FABE(config-rf-domain-default)#use smart-rf-policy Smart-RF1
rfs7000-37FABE(config-rf-domain-default)#use wips-policy WIPS1

rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  contact Bob+14082778691
timezone America/Los_Angeles
stats update-interval 200
country-code us
  use smart-rf-policy Smart-RF1
  use wips-policy WIPS1
  sensor-server 2 ip 172.16.10.3
  override-smartrf channel-list 2.4GHz 1,2,3
  override-wlan test vlan-pool 2 limit 20
layout area Ecospace floor Floor1 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#
```

### Related Commands
- **no** – Resets profiles used with this RF Domain
- **sensor-server** – Configures an AirDefense sensor server on this RF Domain
- **wips-policy** – Configures a WIPS policy
- **smart-rf-policy** – Configures a Smart RF policy
4.1.77 rfs6000

**Global Configuration Commands**

Adds a RFS6000 wireless controller to the network

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

rfs6000 <DEVICE-RFS6000-MAC>

**Parameters**

- rfs6000 <DEVICE-RFS6000-MAC>

| <DEVICE-RFS6000-MAC> | Specify the RFS6000's MAC address. |

**Examples**

rfs7000-37FABE(config)#rfs6000 11-20-30-40-50-61
rfs7000-37FABE(config-device-11-20-30-40-50-61)#

**Related Commands**

- **no**
  
  Removes a RFS6000 wireless controller from the network
4.1.78 rfs7000

Global Configuration Commands

Adds a RFS7000 wireless controller to the network

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

rfs7000 <DEVICE-RFS7000-MAC>

Parameters

- rfs7000 <DEVICE-RFS7000-MAC>

| <DEVICE-RFS7000-MAC> | Specify the RFS7000’s MAC address. |

Examples

rfs7000-37FABE(config)#rfs7000 12-20-30-40-50-62
rfs7000-37FABE(config-device-12-20-30-40-50-62)#

Related Commands

- no
  - Removes a RFS7000 wireless controller from the network
4.1.79 nx45xx

*Global Configuration Commands*

Adds an integrated NX45XX series service platform to the network. If a profile for service platform is not available, a new profile is created.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

---

**NOTE:** In this guide, NX4500 and NX4524 are collectively represented as a NX45XX series service platform.

**Syntax**

nx45xx <DEVICE-NX45XX-MAC>

**Parameters**

- nx45xx <DEVICE-NX45XX-MAC>

  | <DEVICE-NX45XX-MAC> | Specifies the MAC address of a NX45XX series service platform. |

**Examples**

nx9500-6C8809(config)#nx45xx B4-C7-99-5C-FA-8E
nx9500-6C8809(config-device-B4-C7-99-5C-FA-8E)#

**Related Commands**

- no | Removes a NX45XX series service platform from the network |
4.1.80 rfs4000

Global Configuration Commands

Adds an RFS4000 wireless controller to the network

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

rfs4000 <DEVICE-RFS4000-MAC>

Parameters

- rfs4000 <DEVICE-RFS4000-MAC>

<table>
<thead>
<tr>
<th>&lt;DEVICE-RFS4000-MAC&gt;</th>
<th>Specify the RFS4000’s MAC address.</th>
</tr>
</thead>
</table>

Examples

rfs7000-37FABE(config)#rfs4000 10-20-30-40-50-60
rfs7000-37FABE(config-device-10-20-30-40-50-60)#

Related Commands

- no
  Removes an RFS4000 wireless controller from the network
### 4.1.81 nx5500

**Global Configuration Commands**

Adds an integrated NX5500 series service platform to the network. If a profile for this service platform is not available, a new profile is created.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
nx5500 <DEVICE-NX5500-MAC>
```

**Parameters**

- `nx5500 <DEVICE-NX5500-MAC>`

<table>
<thead>
<tr>
<th>&lt;DEVICE-NX5500-MAC&gt;</th>
<th>Specifies the MAC address of a NX5500 series service platform.</th>
</tr>
</thead>
</table>

**Examples**

```
nx9500-6C8809(config)#nx5500 B4-C7-02-3C-FA-6E
nx9500-6C8809(config-device-B4-C7-02-3C-FA-6E)#
```

**Related Commands**

- `no` | Removes a NX5500 series service platform from the network |
4.1.82 nx65xx

**Global Configuration Commands**

Adds an integrated NX65XX series service platform to the network. If a profile for service platform is not available, a new profile is created.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

---

**NOTE:** In this guide, NX6500 and NX6524 are collectively represented as a NX65XX series service platform.

---

### Syntax

nx65xx <DEVICE-NX65XX-MAC>

### Parameters

- nx65xx <DEVICE-NX65XX-MAC>

### Examples

nx9500-6C8809(config)#nx65xx 00-15-70-88-9E-C4

nx9500-6C8809(config-device-00-15-70-88-9E-C4)#

### Related Commands

**no** | Removes a NX65XX series service platform from the network
4.1.83 nx75xx

Global Configuration Commands

Adds an integrated NX75XX series service platform to the network. If a profile for service platform is not available, a new profile is created.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

NOTE: In this guide, NX7500, NX7510, NX7520, and NX7530 are collectively represented as a NX75XX series service platform.

Syntax

```
nx75xx <DEVICE-NX75XX-MAC>
```

Parameters

- `nx75xx <DEVICE-NX75XX-MAC>`

Examples

```
nx9500-6C8809(config)#nx75xx B4-C9-81-6C-FA-7C
nx9500-6C8809(config-device-B4-C9-81-6C-FA-7C)#show context
nx75xx B4-C9-81-6C-FA-7C
  use profile default-nx75xx
  use rf-domain default
  hostname nx75xx-6CFA7C
  nx9500-6C8809(config-device-B4-C9-81-6C-FA-7C)#
nx75xx-6CFA7C>show adoption status
Adopted by:
  Type : nx9000
  System Name : nx9500-6C8809
  MAC address : B4-C7-99-6C-88-09
  MiNT address : 19.6C.88.09
  Time  : 1 days 01:57:50 ago

Adopted Devices:
```

RELATED COMMANDS

- `no` Removes a NX75XX series service platform from the network
4.1.84 nx9000

- **Global Configuration Commands**

Adds a NX9000 series service platform to the network

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

---

**NOTE:** In this guide, NX9000, NX9500, and NX9510 are collectively represented as a NX9000 series service platform.

---

**Syntax**

nx9000 <DEVICE-NX9000-MAC>

**Parameters**

- nx9000 <DEVICE-NX9000-MAC>

<table>
<thead>
<tr>
<th>&lt;DEVICE-NX9000-MAC&gt;</th>
<th>Specifies the MAC address of a NX9000 series service platform.</th>
</tr>
</thead>
</table>

**Examples**

nx9500-6C8809(config)#nx9000 B4-C7-89-7C-81-08

nx9500-6C8809(config-device-B4-C7-89-7C-81-08)#

**Related Commands**

- *no* | Removes a NX9000 series service platform from the network |
4.1.85 roaming-assist-policy

**Global Configuration Commands**

Configures a roaming assist policy that enables access points to assist wireless clients in making roaming decisions, such as which access point to connect, etc.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

roaming-assist-policy <POLICY-NAME>

**Parameters**

- roaming-assist-policy <POLICY-NAME>

<table>
<thead>
<tr>
<th>&lt;POLICY-NAME&gt;</th>
<th>Specify the roaming assist policy name. If the policy does not exist, it is created.</th>
</tr>
</thead>
</table>

**Examples**

rfs7000-37FABE(config)#roaming-assist-policy testPolicy
rfs7000-37FABE(config-roaming-assist-policy-testPolicy)#?

Roaming Assist Mode commands:

- **action** Configure action - action is either to log / deauth
- **aggressiveness** Configure the roaming aggressiveness for a wireless client
- **detection-threshold** Configure the detection threshold - when exceeded, client monitoring starts
- **disassoc-time** Configure the disassociation time - time after which a disassociation is sent
- **handoff-count** Configure the handoff count - number of times client can exceed handoff threshold
- **handoff-threshold** Configure the handoff threshold - when exceeds an action is taken.
- **monitoring-interval** Configure the monitoring interval - interval at which client monitoring occurs
- **no** Negate a command or set its defaults
- **sampling-interval** Configure the sampling interval - interval at which client rssi values are checked
- **clrscr** Clears the display screen
- **commit** Commit all changes made in this session
- **end** End current mode and change to EXEC mode
- **exit** End current mode and down to previous mode
- **help** Description of the interactive help system
- **revert** Revert changes
- **service** Service Commands
- **show** Show running system information
- **write** Write running configuration to memory or terminal

rfs7000-37FABE(config-roaming-assist-policy-testPolicy)#

**Related Commands**

<table>
<thead>
<tr>
<th>no</th>
<th>Removes an existing roaming assist policy</th>
</tr>
</thead>
</table>

**NOTE:** For more information on roaming assist policy commands, see *Chapter 30, ROAMING ASSIST POLICY.*
4.1.86 role-policy

Configure a role-based firewall policy

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
role-policy <ROLE-POLICY-NAME>

Parameters
- role-policy <ROLE-POLICY-NAME>

Examples
rfs7000-37FABE(config)#role-policy role1
rfs7000-37FABE(config-role-policy-role1)#?
Role Policy Mode commands:
  default-role     Configuration for Wireless Clients not matching any role
  ldap-deadperiod Ldap dead period interval
  ldap-query      Set the ldap query mode
  ldap-server     Add a ldap server
  ldap-timeout    Ldap query timeout interval
  no              Negate a command or set its defaults
  user-role       Create a role
  clrscr          Clears the display screen
  commit          Commit all changes made in this session
  do              Run commands from Exec mode
  end             End current mode and change to EXEC mode
  exit            End current mode and down to previous mode
  help            Description of the interactive help system
  revert          Revert changes
  service         Service Commands
  show            Show running system information
  write           Write running configuration to memory or terminal
rfs7000-37FABE(config-role-policy-role1)#

Related Commands

no

Removes an existing role policy

NOTE: For more information on role policy commands, see Chapter 18, ROLE-POLICY.
4.1.87 route-map

Global Configuration Commands

Creates a dynamic BGP route map and enters its configuration mode

BGP route maps are used by network administrators to define rules controlling redistribution of routes between routers and routing processes. These route maps are also used to control and modify routing information.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

Syntax

route-map <ROUTE-MAP-NAME>

Parameters

- route-map <ROUTE-MAP-NAME>

Examples

nx9500-6C8809(config)#route-map test

nx9500-6C8809(config-dr-route-map-test)#?

Route Map Mode commands:
- deny Add a deny route map rule to deny set operations
- no Negate a command or set its defaults
- permit Add a permit route map rule to permit set operations
- clrscr Clears the display screen
- commit Commit all changes made in this session
- do Run commands from Exec mode
- end End current mode and change to EXEC mode
- exit End current mode and down to previous mode
- help Description of the interactive help system
- revert Revert changes
- service Service Commands
- show Show running system information
- write Write running configuration to memory or terminal

Related Commands

no Removes an existing dynamic BGP route map

NOTE: For more information on BGP route maps, see Chapter 28, BORDER GATEWAY PROTOCOL.
4.1.88 routing-policy

Global Configuration Commands

Configures a routing policy

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

routing-policy <ROUTING-POLICY-NAME>

Parameters

- routing-policy <ROUTING-POLICY-NAME>

Examples

rfs7000-37FABE(config)#routing-policy TestRoutingPolicy
rfs7000-37FABE(config-routing-policy-TestRoutingPolicy)#

Routing Policy Mode commands:

- apply-to-local-packets: Use Policy Based Routing for packets generated by the device
- logging: Enable logging for this Route Map
- no: Negate a command or set its defaults
- route-map: Create a Route Map
- use: Set setting to use
- clrscr: Clears the display screen
- commit: Commit all changes made in this session
- do: Run commands from Exec mode
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
- help: Description of the interactive help system
- revert: Revert changes
- service: Service Commands
- show: Show running system information
- write: Write running configuration to memory or terminal

rfs7000-37FABE(config-routing-policy-TestRoutingPolicy)#

Related Commands

- no
  - Removes an existing routing policy

NOTE: For more information on routing policy commands, see Chapter 24, ROUTING-POLICY.
4.1.89 rtl-server-policy

The following table lists the Real Time Locationing (RTL) server policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>rtl-server-policy</td>
<td>Configures an RTL server policy and enters its configuration mode</td>
<td>page 4-375</td>
</tr>
<tr>
<td>rtl-server-policy-mode</td>
<td>Summarizes RTL server policy configuration mode commands</td>
<td>page 4-376</td>
</tr>
</tbody>
</table>
4.1.89.1 rtl-server-policy

**rtl-server-policy**

Creates an RTL server policy and enters its configuration mode. When configured and applied on an access point (AP7522, AP7532, AP8432, AP8533), this policy enables the sending of RSSI feeds from the access point to a third-party Euclid server. The RTL server policy provides the exact location (URL) of the Euclid server. The RSSI feeds sent are as per the sensor-policy configured and applied on the access point. Therefore, ensure that a sensor-policy, with the `rssi-interval-duration` specified, is existing, configured, and applied on the access points.

To initiate RSSI feed posts to the Euclid locationing server, use the RTL server policy on the:

- AP’s device/profile context, or
- AP’s RF Domain context.

Supported in the following platforms:

- Access Points — AP7522, AP7532, AP8432, AP8533
- Wireless Controllers — RFS4000
- Service Platforms — NX9000, NX9500, NX9510, NX9600

**Syntax**

```
rtl-server-policy <RTL-POLICY-NAME>
```

**Parameters**

- `rtl-server-policy <RTL-POLICY-NAME>`

**Examples**

```
nx9500-6C8809(config)#rtl-server-policy test
nx9500-6C8809(config-rtl-server-policy-test)#?
```

RTL Server Policy Mode commands:

- `no` Negate a command or set its defaults
- `url` Configure the url to send the real time RSSI feed to
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
nx9500-6C8809(config-rtl-server-policy-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an existing RTL server policy</td>
</tr>
<tr>
<td><code>use</code> (profile/device configuration mode command)</td>
<td>Documents the ‘use’ command in a device’s profile or device configuration context. Use this option to associate this RTL server policy to an access point’s profile or device.</td>
</tr>
<tr>
<td><code>use</code> (RF Domain configuration mode command)</td>
<td>Documents the ‘use’ command in the RF Domain configuration context. Use this option to associate this RTL server policy to an RF Domain. When associated, the policy is applied to all access points within the RF Domain.</td>
</tr>
</tbody>
</table>
### 4.1.89.2 rtl-server-policy-mode commands

The following table summarizes the RTL server policy configuration mode commands:

**Table 4.42** RTL-Server-Policy Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>url</td>
<td>Configures the third-party Euclid RTL server’s URL</td>
<td>page 4-377</td>
</tr>
<tr>
<td>no</td>
<td>Removes the Euclid RTL server’s URL configuration</td>
<td>page 4-378</td>
</tr>
</tbody>
</table>
4.1.89.2.1 url

rtl-server-policy-mode commands

Configures the third-party Euclid RTL server’s exact location. This is the URL at which the server can be reached.

Supported in the following platforms:
- Access Points — AP7522, AP7532, AP8432, AP8533
- Wireless Controllers — RFS4000
- Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax
url <URL>

Parameters
- url <URL>

<table>
<thead>
<tr>
<th>url &lt;URL&gt;</th>
<th>Configures the Euclid server’s URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;URL&gt;</td>
<td>- &lt;URL&gt; – Specify the URL.</td>
</tr>
</tbody>
</table>

Examples
nx9500-6C8809(config-rtl-server-policy-test)#url https://testrtlsever.com

nx9500-6C8809(config-rtl-server-policy-test)#show context
rtl-server-policy test
  url https://testrtlsever.com

nx9500-6C8809(config-rtl-server-policy-test)#

Related Commands
no
  Removes the Euclid server’s configured URL
4.1.89.2.2  no

4 rtl-server-policy-mode commands

Removes the Euclid locationing server’s URL configuration

Supported in the following platforms:
- Access Points — AP7522, AP7532, AP8432, AP8533
- Wireless Controllers — RFS4000
- Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax
no url

Parameters
- no url

| no url | Removes the Euclid server's URL |

Examples
The following example displays the RTL server policy ‘test’ settings before the ‘no’ command is executed:

nx9500-6C8809(config-rtl-server-policy-test)#show context
rtl-server-policy test
  url https://testrtlserver.com
nx9500-6C8809(config-rtl-server-policy-test)#

The following example displays the RTL server policy ‘test’ settings after the ‘no’ command is executed:

nx9500-6C8809(config-rtl-server-policy-test)#show context
rtl-server-policy test
nx9500-6C8809(config-rtl-server-policy-test)#
4.1.90 schedule-policy

The following table summarizes the config schedule policy commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>schedule-policy</td>
<td>Creates a schedule policy and enters its configuration mode</td>
<td>page 4-380</td>
</tr>
<tr>
<td>schedule-policy-mode</td>
<td>Lists schedule policy configuration mode commands</td>
<td>page 4-381</td>
</tr>
<tr>
<td>commands</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.1.90.1 schedule-policy

*schedule-policy*

Creates a schedule policy and enters its configuration mode. A schedule policy strategically enforces application filter policy rules during administrator assigned intervals.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
schedule-policy <SCHEDULE-POLICY-NAME>
```

**Parameters**

- `schedule-policy <SCHEDULE-POLICY-NAME>`

**Examples**

```
nx9500-6C8809(config)#schedule-policy test
nx9500-6C8809(config-schedule-policy-test)#?
```

Schedule Policy Mode commands:

- `description` Schedule policy description
- `no` Negate a command or set its defaults
- `time-rule` Configure a time rule
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
nx9500-6C8809(config-schedule-policy-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>no</th>
<th>Removes an existing schedule policy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.1.90.2 schedule-policy-mode commands

The following table summarizes schedule-policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Configures a description for this schedule policy that differentiates it from other policies with similar time rule configurations</td>
<td>page 4-382</td>
</tr>
<tr>
<td>time-rule</td>
<td>Configures a time rule specifying the days and optionally the start and end times</td>
<td>page 4-383</td>
</tr>
<tr>
<td>no</td>
<td>Removes the selected schedule policy’s settings</td>
<td>page 4-384</td>
</tr>
</tbody>
</table>
4.1.90.2.1 description

* schedule-policy-mode commands

Configures a description for this schedule policy that differentiates it from other policies with similar time rule configurations.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

description <WORD>

**Parameters**
- description <WORD>

<table>
<thead>
<tr>
<th>command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>description &lt;WORD&gt;</td>
<td>Configures this schedule policy’s description</td>
</tr>
<tr>
<td>&lt;WORD&gt;</td>
<td>&lt;WORD&gt; – Enter a description not exceeding 80 characters in length. The description should uniquely identify the policy from other policies with similar configuration.</td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C8809(config-schedule-policy-test)#description "Denies social networking sites on weekdays."

nx9500-6C8809(config-schedule-policy-test)#show context schedule-policy test
description "Denies social networking sites on weekdays."
nx9500-6C8809(config-schedule-policy-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes this schedule policy’s description</td>
</tr>
</tbody>
</table>
4.1.90.2.2 time-rule

Configures a time rule specifying the days and optionally the start and end times. When applied to an application-policy rule, the schedule policy defines the enforcement time of the rule. For more information, see application-policy.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
time-rule days [sunday|monday|tuesday|wednesday|thursday|friday|saturday|all|weekends|weekdays] {start-time <HH:MM> [end-time <HH:MM>]}
```

Parameters

<table>
<thead>
<tr>
<th>days</th>
<th>Specifies the days on which the time rule is applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>[sunday</td>
<td>monday</td>
</tr>
<tr>
<td></td>
<td>• monday – Applicable on Mondays only</td>
</tr>
<tr>
<td></td>
<td>• tuesday – Applicable on Tuesdays only</td>
</tr>
<tr>
<td></td>
<td>• wednesday – Applicable on Wednesdays only</td>
</tr>
<tr>
<td></td>
<td>• thursday – Applicable on Thursdays only</td>
</tr>
<tr>
<td></td>
<td>• friday – Applicable on Fridays only</td>
</tr>
<tr>
<td></td>
<td>• saturday – Applicable on Saturdays only</td>
</tr>
<tr>
<td></td>
<td>• weekends – Applicable on weekends only</td>
</tr>
<tr>
<td></td>
<td>• weekdays – Applicable on weekdays only</td>
</tr>
<tr>
<td></td>
<td>• all – Applicable on all days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>start-time <a href="">HH:MM</a> [end-time <a href="">HH:MM</a>]</th>
<th>After specifying the days of enforcement, specify the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• start-time – Optional. Specifies the enforcement start time</td>
</tr>
<tr>
<td></td>
<td>• <a href="">HH:MM</a> – Specify the start time in hours and minutes in the HH:MM format.</td>
</tr>
<tr>
<td></td>
<td>If no start time is specified, the time rule is enforced, on the specified days, at all time.</td>
</tr>
<tr>
<td></td>
<td>• end-time – Specifies the enforcement end time</td>
</tr>
<tr>
<td></td>
<td>• <a href="">HH:MM</a> – Specify the time in hours and minutes in the HH:MM format.</td>
</tr>
</tbody>
</table>

Examples

```
nx9500-6C8809(config-schedule-policy-test)#time-rule days weekdays start-time 10:00 end-time 23:30
```

```
nx9500-6C8809(config-schedule-policy-test)#show context
```

description "Denies social networking sites on weekdays."

time-rule days weekdays start-time 10:00 end-time 23:30

```
nx9500-6C8809(config-schedule-policy-test)#
```

Related Commands

| no | Removes the time-rule from the schedule policy |
4.1.90.2.3 no

*schedule-policy-mode commands*

Removes the selected schedule policy’s settings

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

no [description|time-rule]

no description

no time-rule days [sunday|monday|tuesday|wednesday|thursday|friday|saturday|all|weekends|weekdays]

**Parameters**

- no <PARAMETERS>

  
  no <PARAMETERS> Removes the schedule policy’s settings based on the parameters passed

**Examples**

The following example displays the schedule policy ‘test’ settings before the ‘no’ commands have been executed:

nx9500-6C8809(config-schedule-policy-test)#show context
schedule-policy test
description "Denies social networking sites on weekdays."
time-rule days weekdays start-time 10:00 end-time 23:30
nx9500-6C8809(config-schedule-policy-test)#

The following example displays the schedule policy ‘test’ settings after the ‘no’ commands have been executed:

nx9500-6C8809(config-schedule-policy-test)#no description
nx9500-6C8809(config-schedule-policy-test)#no time-rule days weekdays

nx9500-6C8809(config-schedule-policy-test)#show context
schedule-policy test
nx9500-6C8809(config-schedule-policy-test)#
4.1.91 **self**

> **Global Configuration Commands**

Displays the logged device’s configuration context

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
self
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config)#self
rfs7000-37FABE(config-device-00-15-70-37-FA-BE)#
```
4.1.92 sensor-policy

*Global Configuration Commands*

The following table summarizes the config sensor policy commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>sensor-policy</td>
<td>Creates a sensor policy and enters its configuration mode</td>
<td>page 4-387</td>
</tr>
<tr>
<td>sensor-policy-mode commands</td>
<td>Lists sensor policy configuration mode commands</td>
<td>page 4-389</td>
</tr>
</tbody>
</table>
### 4.1.92.1 sensor-policy

A sensor policy is created and enters its configuration mode. When created and used on WiNG devices, this policy enables controllers and access points to function as sensors. Within the MPact architecture, these sensors scan for RSSI data at specified intervals, and forward the gathered RSSI data to a dedicated MPact server. The MPact server calculates the location of Wi-Fi devices on the basis of the data received.

Use this command to configure a policy defining the mode of scanning, the channels to scan (in case scan-mode is set to custom-scan), and the RSSI interval. For the sensor policy to take effect, use the policy either in the access point's RF Domain context or in the access point's device context.

**Syntax**

```plaintext
sensor-policy <SENSOR-POLICY-NAME>
```

**Parameters**

- `sensor-policy <SENSOR-POLICY-NAME>`

**Usage Guidelines**

Access point radios, functioning as sensors, along with AirDefense WIPS servers protect networks from attacks and unauthorized access. These access point sensors scan legal channels and (based on a WIPS policy settings) identify events potential threats to the managed network. These events are reported to the AirDefense WIPS server, which determines the action taken.

In addition to WIPS support, sensor functionality has now been added for Zebra’s MPact locationing system. The MPact system for Wi-Fi locationing includes WiNG controllers and access points functioning as sensors. Within the MPact architecture, sensors scan for RSSI data on an administrator-defined interval and send to a dedicated MPact server resource, as opposed to an ADSP server. The MPact server collects the RSSI data from WiNG sensor devices, and calculates the location of Wi-Fi devices. With the introduction of the MPact platform, the data collected by access point radios, functioning as sensors, is also used by the MPact server to provide real-time locationing services.
Examples
nx9500-6C8809(config)#sensor-policy test
nx9500-6C8809(config-sensor-policy-test)#?

Sensor Policy Mode commands:
- custom-scan: Channel configuration in Custom Scan channels
- no: Negate a command or set its defaults
- rssi-interval-duration: Configure the periodicity of sending RSSI info from sensor to server
- scan-mode: Configure the Scan mode
- clrscr: Clears the display screen
- commit: Commit all changes made in this session
- do: Run commands from Exec mode
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
- help: Description of the interactive help system
- revert: Revert changes
- service: Service Commands
- show: Show running system information
- write: Write running configuration to memory or terminal

Related Commands

no | Removes an existing sensor policy
4.1.92.2 sensor-policy-mode commands

The following table summarizes sensor-policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>custom-scan</td>
<td>Configures the channel scanning settings when the scan-mode is set to custom-scan</td>
<td>page 4-390</td>
</tr>
<tr>
<td>rssi-interval-duration</td>
<td>Configures the interval at which dedicated sensors scan channels for RSSI assessments and send the collected data to a specified MPact server resource</td>
<td>page 4-392</td>
</tr>
<tr>
<td>scan-mode</td>
<td>Configures the mode of scanning used by dedicated sensors (access point radios)</td>
<td>page 4-393</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts to default a sensor policy’s settings</td>
<td>page 4-394</td>
</tr>
</tbody>
</table>
### 4.1.92.2.1 custom-scan

#### sensor-policy-mode commands

Configures the channel scanning settings when the `scan-mode` is set to `custom-scan`

#### NOTE:
If the mode of scanning is set to Custom-Scan, use this command to configure the channels to be scanned. To set the mode of scanning to custom-scan, use the `scan-mode > Custom-Scan` command. For more information, see `scan-mode`.

Supported in the following platforms:
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
custom-scan channel-frequency <CHANNEL-FREQUENCY> width [20MHz|40MHz-Both|40MHz-Lower|40MHz-Upper|80MHz] scan-weight <SCAN-WEIGHT>
```

#### Parameters
- `custom-scan channel-frequency <CHANNEL-FREQUENCY> width [20MHz|40MHz-Both|40MHz-Lower|40MHz-Upper|80MHz] scan-weight <SCAN-WEIGHT>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-frequency</td>
<td>Configures the custom-scan channel frequency, channel width, and scan weight</td>
</tr>
</tbody>
</table>
| <CHANNEL-FREQUENCY> | Specifies the channel frequency. A list of unique channels in the 2.4, 4.9, 5 and 6 GHz band can be collectively or individually enabled for customized channel scans and RSSI reporting.  
  - `<CHANNEL-FREQUENCY>` – Specify a single or multiple, ‘comma-separated’ channel frequencies. |
| width [20MHz|40MHz-Both|40MHz-Lower|40MHz-Upper|80MHz] | Configures the channel width. When custom channels are selected for RSSI scans, each selected channel can have its own width defined. Numerous channels have their width fixed at 20MHz, 802.11a radios support 20 and 40 MHz channel widths.  
  - 20MHz – Selects the channel width as 20 Mhz  
  - 40Mhz-Both – Selects the channel width as 40Mhz-Both  
  - 40Mhz-Lowr – Selects the channel width as 40Mhz-Lower  
  - 40Mhz-Upper – Selects the channel width as 40Mhz-Upper  
  - 80Mhz – Selects the channel width as 80Mhz |
| scan-weight <SCAN-WEIGHT> | Configures the scan-weight (scanning duration) for each of the selected channels. Each selected channel can have its weight prioritized in respect to the amount of time a scan is permitted within the defined RSSI scan interval.  
  - `<SCAN-WEIGHT>` – Specify the scan weightage given to each selected channel. |

#### Examples

```
nx9500-6C8809(config-sensor-policy-test)#custom-scan channel-frequency 2412 width 20MHz scan-weight 1000

nx9500-6C8809(config-sensor-policy-test)#custom-scan channel-frequency 2417 width 20MHz scan-weight 1000

nx9500-6C8809(config-sensor-policy-test)#show context
sensor-policy test
  scan-mode Custom-Scan
  custom-scan channel-frequency 2412 width 20MHz scan-weight 1000
  custom-scan channel-frequency 2417 width 20MHz scan-weight 1000
  nx9500-6C8809(config-sensor-policy-test)#
```
Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes channels from the channels-to-scan list in case of scan-mode being set to Custom-Scan</td>
</tr>
</tbody>
</table>
### 4.1.92.2.2 rssi-interval-duration

**sensor-policy-mode commands**

Configures the interval, in seconds, at which dedicated sensors (access point radios) scan channels for RSSI (signal strength) assessments and send the RSSI data obtained to a specified MPact server resource.

Supported in the following platforms:

- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`rssi-interval-duration <1-60>`

**Parameters**

- `rssi-interval-duration <1-60>`

| rssi-interval-duration <1-60> | Configures the RSSI interval duration in seconds. This is the interval at which the sensor scans channels for RSSI data and forwards the data to a MPact server resource. The MPact server calculates real-time locations of Wi-Fi devices based on this data.
|                            | - `<1-60>` – Specify the RSSI interval duration from 1 - 60 seconds. The default is 1 second.
|                            | **Note:** The channels scanned for RSSI assessment depends on the scan-mode selected. For more information, see `scan-mode` and `custom-scan`.
|                            | Ensure that the MPact server’s IP address or hostname has been configured in the access point sensor’s RF Domain context. The sensor sends only the locationing related data to the MPact server. |

#### Examples

```plaintext
nx9500-6C8809(config-sensor-policy-test)#rssi-interval-duration 30
nx9500-6C8809(config-sensor-policy-test)#show context sensor-policy test
  rssi-interval-duration 30
  scan-mode Custom-Scan
  custom-scan channel-frequency 2412 width 20MHz scan-weight 1000
  custom-scan channel-frequency 2417 width 20MHz scan-weight 1000
nx9500-6C8809(config-sensor-policy-test)#
```

**Related Commands**

| **no** | Resets the interval at which RSSI data is collected and sent by the sensor to the MPact server host to default (1 second) |
### 4.1.92.2.3 scan-mode

**sensor-policy-mode commands**

Configures the mode of scanning used by dedicated sensors (access point radios).

Supported in the following platforms:

- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
scan-mode [Channel-Lock|Custom-Scan|Default-Scan]
scan-mode Channel-Lock lock-frequency <LOCK-FREQUENCY>
scan-mode [Custom-Scan|Default-Scan]
```

**Parameters**

- **scan-mode Channel-Lock lock-frequency <LOCK-FREQUENCY>**
  - Configures the mode of scanning as Channel-Lock
  - lock-frequency <LOCK-FREQUENCY> — Locks scanning for RSSI data to one specific channel identified by the <LOCK-FREQUENCY> parameter. When specified, the existing channel, channel width, and scan weight table items are replaced by channel specified here.
  - <LOCK-FREQUENCY> — Specify the channel frequency. When specified, the existing channel, channel width, and scan weight table items are replaced by channel specified here. The sensor scans only this specified channel.

- **scan-mode [Custom-Scan|Default-Scan]**

**Examples**

```
nx9500-6C8809(config-sensor-policy-test)#scan-mode Custom-Scan

nx9500-6C8809(config-sensor-policy-test)#show context sensor-policy test
  rssi-interval-duration 30
  scan-mode Custom-Scan
  custom-scan channel-frequency 2412 width 20MHz scan-weight 1000
  custom-scan channel-frequency 2417 width 20MHz scan-weight 1000

nx9500-6C8809(config-sensor-policy-test)#
```

**Related Commands**

- **no** Reverts the scan-mode to default (Default-Scan)
4.1.92.2.4 no

sensor-policy-mode commands

Removes or reverts to default a sensor policy’s settings

Supported in the following platforms:
  • Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [custom-scan|rss1-interval-duration|scan-mode]

no custom-scan channel-frequency <CHANNEL-FREQUENCY-LIST>

no rssi-interval-duration

no scan-mode

Parameters

• no <PARAMETERS>

no <PARAMETERS> Removes or reverts to default a sensor policy settings based on the parameters passed

Examples

The following example shows the sensor-policy 'test' settings before the 'no' commands are executed:

nx9500-6C8809(config-sensor-policy-test)#show context
sensor-policy test
  rssi-interval-duration 30
  scan-mode Custom-Scan
  custom-scan channel-frequency 2412 width 20MHz scan-weight 1000
  custom-scan channel-frequency 2417 width 20MHz scan-weight 1000

The scan-mode is reverted back to the default setting of 'Default-Scan', as show in the following output:

nx9500-6C8809(config-sensor-policy-test)#no scan-mode
nx9500-6C8809(config-sensor-policy-test)#show context
sensor-policy test
  rssi-interval-duration 30
  scan-mode Default-Scan
  custom-scan channel-frequency 2412 width 20MHz scan-weight 1000
  custom-scan channel-frequency 2417 width 20MHz scan-weight 1000

nx9500-6C8809(config-sensor-policy-test)#no custom-scan channel-frequency 2412

nx9500-6C8809(config-sensor-policy-test)#no custom-scan channel-frequency 2417

nx9500-6C8809(config-sensor-policy-test)#no context

nx9500-6C8809(config-sensor-policy-test)#show context
sensor-policy test
  rssi-interval-duration 30
  scan-mode Default-Scan

nx9500-6C8809(config-sensor-policy-test)#
4.1.93 smart-rf-policy

Global Configuration Commands

Configures a Smart RF policy

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
smart-rf-policy <SMART-RF-POLICY-NAME>

Parameters
- smart-rf-policy <SMART-RF-POLICY-NAME>

Examples
rfs7000-37FABE(config)#smart-rf-policy test
rfs7000-37FABE(config-smart-rf-policy-test)##

Smart RF Mode commands:
- area Specify channel list/ power for an area
- assignable-power Specify the assignable power during power-assignment
- avoidance-time Time to avoid a channel once dfs/adaptivity avoidance is necessary
- channel-list Select channel list for smart-rf
- channel-width Select channel width for smart-rf
- coverage-hole-recovery Recover from coverage hole
- enable Enable this smart-rf policy
- group-by Configure grouping parameters
- interference-recovery Recover issues due to excessive noise and interference
- neighbor-recovery Recover issues due to faulty neighbor radios
- no Negate a command or set its defaults
- sensitivity Configure smart-rf sensitivity (Modifies various other smart-rf configuration items)
- smart-ocs-monitoring Smart off channel scanning
- clrscr Clears the display screen
- commit Commit all changes made in this session
- end End current mode and change to EXEC mode
- exit End current mode and down to previous mode
- help Description of the interactive help system
- revert Revert changes
- service Service Commands
- show Show running system information
- write Write running configuration to memory or term

rfs7000-37FABE(config-smart-rf-policy-test)##

Related Commands

| no | Removes an existing Smart RF policy |

**NOTE:** For more information on Smart RF policy commands, see Chapter 19, SMART-RF-POLICY.
4.1.94 t5

**Global Configuration Commands**

Invokes the configuration mode of a t5 wireless controller

A T5 controller uses the IPX operating system to manage its connected radio devices, as opposed to the WiNG operating system used by RFS controllers and NX service platforms. However, a T5 controller, once enabled as a supported external device, can provide data to WiNG to assist in a T5's management within a WiNG supported subnet populated by both types of devices.

Supported in the following platforms:

- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

t5 <T5-DEVICE-MAC>

**Parameters**

- t5 <T5-DEVICE-MAC>

<table>
<thead>
<tr>
<th>t5 &lt;T5-DEVICE-MAC&gt;</th>
<th>Specify the t5 device’s MAC address. The system enters the identified device’s configuration mode.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A T5 controller uses the IPX operating system to manage its connected radio devices, as opposed to the WiNG operating system used by RFS wireless controllers and NX service platforms. However, a T5 controller, once enabled as a supported external device, can provide data to WiNG to assist in a T5’s management within a WiNG supported subnet populated by both types of devices. The Customer Premises Equipment (CPEs) are the T5 controller managed radio devices using the IPX operating system. These CPEs use a Digital Subscriber Line (DSL) as their high speed Internet access mechanism using the CPE’s physical wallplate connection and phone jack. <strong>Note:</strong> After logging on to the T5 device, use the ‘cpe’ keyword and configure the following mandatory settings:</td>
</tr>
<tr>
<td></td>
<td>• vlan – Set a VLAN from 1 - 4,094 used as a virtual interface for connections between the T5 controller and its managed CPE devices.</td>
</tr>
<tr>
<td></td>
<td>• start ip – Set a starting IP address used in a range of addresses available to T5 controller connecting CPE devices.</td>
</tr>
<tr>
<td></td>
<td>• end ip – Set an end IP address used in a range of addresses available to T5 controller connecting CPE devices.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config)#t5 B4:C7:99:ED:5C:2C
rfs7000-37FABE(config-device-B4:C7:99:ED:5C:2C)#?

T5 Device Mode commands:

- adsp-sensor-server Configure WIPS server
- bridge Sets MAC address expiration time in the bridge address table
- clock Configure clock options
- cpe T5 CPE configuration
- hostname Set system’s network name
- interface Select an interface to configure
- ip Internet Protocol (IP)
- no Negate a command or set its defaults
- ntp Configure NTP
- override-wlan Configure RF Domain level overrides for wlan
- password T5 password configuration
- qos QoS settings
- radius-server Radius server settings
- t5 T5 configuration
- t5-logging Modify message logging facilities
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>use</td>
<td>Set setting to use</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config-device-B4:C7:99:ED:5C:2C)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the t5 wireless controller identified by the device’s MAC address</td>
</tr>
</tbody>
</table>
4.1.95 web-filter-policy

Global Configuration Commands

The following table lists commands that enable you to enter the Web Filter policy configuration mode:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>web-filter-policy</strong></td>
<td>Creates a new Web Filter policy and enters its configuration mode</td>
<td>page 4-523</td>
</tr>
<tr>
<td><strong>web-filter-policy-config-mode commands</strong></td>
<td>Summarizes the Web Filter policy configuration mode commands</td>
<td>page 4-400</td>
</tr>
</tbody>
</table>
4.1.95.1 web-filter-policy

web-filter-policy

Creates a Web Filtering policy and enters its configuration mode. This policy defines rules managing the local classification database and the cached data. When configured and applied, this policy also enables caching of URL classification records in a local database in a controller-based, hierarchically managed (HM) deployment. Use this option to specify the following: classification server details, size of the local database, time for which records are cached in the database, the action taken in case the classification server is unavailable, etc.

The Web filter policy is applied at the profile or device level.

For more information on URL filtering, see url-filter.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

web-filter-policy <WEB-FILTER-POLICY-NAME>

Parameters

- <WEB-FILTER-POLICY-NAME>

Specify the Web filter policy name. If the policy does not exist, it is created.

Examples

nx4500-5CFA2B(config)#web-filter-policy test
nx4500-5CFA2B(config-web-filter-policy-test)#?

Content Filter Mode commands:

- cache-max-recs: Configure the maximum number of records in local cache
- cache-save-interval: Configure the time a record is saved in local cache
- logging: Select logging method
- no: Negate a command or set its defaults
- server-host: Configure URL classification server if it is not the adopted controller
- server-unreachable: Permission to access website when classification server is unreachable (default is pass)
- uncategorized-url: Permission to website when server fails to classify the URL request (default is pass)
- clrscr: Clears the display screen
- commit: Commit all changes made in this session
- do: Run commands from Exec mode
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
- help: Description of the interactive help system
- revert: Revert changes
- service: Service Commands
- show: Show running system information
- write: Write running configuration to memory or terminal

Related Commands

| no | Removes an existing Web filter policy |
### 4.1.95.2 web-filter-policy-config-mode commands

> **web-filter-policy**

The following table summarizes Web Filter policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>cache-max-recs</code></td>
<td>Configures the maximum number of records (URLs and Web pages) cached in the local database</td>
<td>page 4-401</td>
</tr>
<tr>
<td><code>cache-save-interval</code></td>
<td>Configures the maximum time period for which a record (URL and Web page classification entry) is cached in the local database</td>
<td>page 4-402</td>
</tr>
<tr>
<td><code>logging</code></td>
<td>Configures the method used to log Web filtering events</td>
<td>page 4-403</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Reverts the selected Web Filter policy settings to default</td>
<td>page 4-404</td>
</tr>
<tr>
<td><code>server-host</code></td>
<td>Configures the URL classification server in case it is not the adopted controller</td>
<td>page 4-405</td>
</tr>
<tr>
<td><code>server-unreachable</code></td>
<td>Configures the action taken in case the classification server is unreachable</td>
<td>page 4-406</td>
</tr>
<tr>
<td><code>uncategorized-url</code></td>
<td>Configures the action taken in case the classification server fails to classify a URL/Website</td>
<td>page 4-407</td>
</tr>
</tbody>
</table>
4.95.2.1 cache-max-recs

**web-filter-policy-config-mode commands**

Configures the maximum number of records (URL and Web page classification entries) cached in the local database.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

cache-max-recs <1-1000000>

**Parameters**
- cache-max-recs <1-1000000>

<table>
<thead>
<tr>
<th>cache-max-recs &lt;1-1000000&gt;</th>
<th>Specify the maximum number of records cached in the local database from 1 - 1000000. When configuring this value take into consideration the type of device using the Web Filter policy. The value should approximately be as per the following information:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• NX95XX – &lt;1-1000000&gt; (default is 100000)</td>
</tr>
<tr>
<td></td>
<td>• NX45XX/NX65XX/NX75XX – &lt;1-1000000&gt; (default is 10000)</td>
</tr>
<tr>
<td></td>
<td>• RFS Switches – &lt;1-10000&gt; (default is 1000)</td>
</tr>
<tr>
<td></td>
<td>• Access Points – &lt;1-1500&gt; (default is 500)</td>
</tr>
</tbody>
</table>

**Examples**

nx4500-5CFA2B(config-web-filter-policy-test)#cache-max-recs 9000

nx4500-5CFA2B(config-web-filter-policy-test)#show context web-filter-policy test
cache-max-recs 9000
nx4500-5CFA2B(config-web-filter-policy-test)#

**Related Commands**

| no | Reverts the maximum number of stored records to default. Please see the parameter table for default values for the different device types. |
4.95.2.2 cache-save-interval

Configures the maximum time period, in seconds, for which a record (URL and Web page classification entry) is cached in the local database. Once the specified time has expired the record is removed from the cache.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

\[ \text{cache-save-interval} \ <1-86400> \]

Parameters

\[ \text{cache-save-interval} \ <1-86400> \]

<table>
<thead>
<tr>
<th>cache-save-interval &lt;1-86400&gt;</th>
<th>Specify the maximum time period, in seconds, for which a record is cached in the local database from 1 - 86400 seconds. The default is 60 seconds.</th>
</tr>
</thead>
</table>

Examples

\[
\begin{align*}
nx4500-5CFA2B(config-web-filter-policy-test)# & \text{cache-save-interval} 1000 \\
nx4500-5CFA2B(config-web-filter-policy-test)# & \text{show context} \\
& \text{web-filter-policy test} \\
& \text{cache-max-recs} 9000 \\
& \text{cache-save-interval} 1000 \\
nx4500-5CFA2B(config-web-filter-policy-test)# & \\
\end{align*}
\]

Related Commands

\[ \text{no} \]

Reverts the maximum time period for which a record (URL and Web page classification entry) is cached in the local database to default (60)
4.1.95.2.3 logging

- **web-filter-policy-config-mode commands**

Configures the method used to log Web filtering events

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

`logging [logfile|syslog]`

**Parameters**
- `logging [logfile|syslog]`

| logging [logfile|syslog] | Selects the method used to log Web filtering events. The options are: |
|------------------------|-------------------------------------------------------------------|
|                        | • logfile – Logs to a file.                                       |
|                        | • syslog – Logs to the syslog server. This is the default setting.|

**Examples**

```
nx9500-6C8809(config-web-filter-policy-test)#logging logfile

nx9500-6C8809(config-web-filter-policy-test)#show context
web-filter-policy test
  logging logfile

nx9500-6C8809(config-web-filter-policy-test)#
```
4.1.95.2.4 no

web-filter-policy-config-mode commands

Reverts the selected Web Filter policy settings to default, based on the parameters passed

Supported in the following platforms:

- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

no [cache-max-recs|cache-save-interval|server-host|server-unreachable|uncategorized-url]

Parameters

- no <PARAMETERS>

no <PARAMETERS> Reverts the selected Web Filter policy settings to default, based on the parameters passed. Specify the parameters to revert back to default value.

Examples

The following example shows the Web Filter policy ‘test’ settings before the ‘no’ command is executed:

```
nx4500-5CFA2B(config-web-filter-policy-test)#show context
web-filter-policy test
  cache-max-recs 9000
  cache-save-interval 1000
  uncategorized-url block
  server-unreachable block
  server-host ip-address 192.168.13.13
nx4500-5CFA2B(config-web-filter-policy-test)#
```

```
nx4500-5CFA2B(config-web-filter-policy-test)#no cache-max-recs
nx4500-5CFA2B(config-web-filter-policy-test)#no server-unreachable
nx4500-5CFA2B(config-web-filter-policy-test)#no uncategorized-url
```

The following example shows the Web Filter policy ‘test’ settings after the ‘no’ command has been executed:

```
nx4500-5CFA2B(config-web-filter-policy-test)#show context
web-filter-policy test
  cache-save-interval 1000
  server-host ip-address 192.168.13.13
nx4500-5CFA2B(config-web-filter-policy-test)#
```
4.1.95.2.5 server-host

**web-filter-policy-config-mode commands**

Configures the URL classification server in case it is not the adopted controller.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**
```
server-host [host-name <SERVER-HOST-NAME>|ip-address <SERVER-IPv4>|mint-id <SERVER-MiNT-ID>]
```

**Parameters**
- `server-host [host-name <SERVER-HOST-NAME>|ip-address <SERVER-IPv4>|mint-id <SERVER-MiNT-ID>]`

| server-host [host-name <SERVER-HOST-NAME>|ip-address <SERVER-IPv4>|mint-id <SERVER-MiNT-ID>] | Use one of the following options to identify the URL classification server: |
| --- | --- |
|  | • host-name <SERVER-HOST-NAME> – Identifies the classification server by its hostname. |
|  | • ip-address <SERVER-IPv4> – Identifies the classification server by its IP address. |
|  | • mint-id <SERVER-MiNT-ID> – Identifies the classification server by its MiNT ID. |

**Examples**
```
nx4500-5CFA2B(config-web-filter-policy-test)#server-host ip-address 192.168.13.13
```
```
nx4500-5CFA2B(config-web-filter-policy-test)#show context
```
```
web-filter-policy test
  cache-max-recs 9000
  cache-save-interval 1000
  server-host ip-address 192.168.13.13
```
```
nx4500-5CFA2B(config-web-filter-policy-test)#
```

**Related Commands**

| no | Removes the URL classification server’s configured details, such as hostname, ip-address, or MiNT ID. |
4.1.95.2.6 server-unreachable

Configures the action taken in case the classification server is unreachable. Based on the value configured the an end user’s request for a URL/Website is either blocked or passed.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax
server-unreachable [block|pass]

Parameters
- server-unreachable [block|pass]

| server-unreachable [block|pass] | Configures the action taken in case the classification server is unreachable. The options are:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>block – Denies access to the requested URL/Website</td>
</tr>
<tr>
<td></td>
<td>pass – Allows access to the requested URL/Website. This is the default value.</td>
</tr>
</tbody>
</table>

Examples
nx4500-5CFA2B(config-web-filter-policy-test)#server-unreachable block

nx4500-5CFA2B(config-web-filter-policy-test)#show context
web-filter-policy test
  cache-max-recs 9000
  cache-save-interval 1000
  server-unreachable block
  server-host ip-address 192.168.13.13
nx4500-5CFA2B(config-web-filter-policy-test)#

Related Commands
- no Reverts the action taken in case the classification server is unreachable to default (pass)
4.1.95.2.7 uncategorized-url

**web-filter-policy-config-mode commands**

Configures the action taken in case the classification server fails to classify a URL/Website. Based on the value configured, the end user's request for a non-classified URL/Website is either blocked or passed.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

```
uncategorized-url [block|pass]
```

**Parameters**

\* uncategorized-url [block|pass]

| uncategorized-url [block|pass] | Configures the action taken in case the classification server fails to classify a URL/Website. The options are: |
|-----------------------------|-------------------------------------------------------------------------------------------------------------|
| block | Denies access to the requested non-classified URL/Website |
| pass | Allows access to the requested non-classified URL/Website. This is the default value. |

**Examples**

```
nx4500-5CFA2B(config-web-filter-policy-test)#uncategorized-url block
```

```
nx4500-5CFA2B(config-web-filter-policy-test)#show context
web-filter-policy test
  cache-max-recs 9000
  cache-save-interval 1000
  uncategorized-url block
  server-unreachable block
  server-host ip-address 192.168.13.13
nx4500-5CFA2B(config-web-filter-policy-test)#
```

**Related Commands**

```
no
```

Reverts the action taken in case the classification server fails to classify a URL/Website to default (pass)
### 4.1.96 wips-policy

**Global Configuration Commands**

Configures a WIPS policy

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
wips-policy <WIPS-POLICY-NAME>
```

**Parameters**

- `wips-policy <WIPS-POLICY-NAME>`

<table>
<thead>
<tr>
<th><code>&lt;WIPS-POLICY-NAME&gt;</code></th>
<th>Specify the WIPS policy name. If the policy does not exist, it is created.</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config)#wips-policy test
rfs7000-37FABE(config-wips-policy-test)#?
```

Wips Policy Mode commands:

- `ap-detection` Rogue AP detection
- `enable` Enable this wips policy
- `event` Configure an event
- `history-throttle-duration` Configure the duration for which event duplicates are not stored in history
- `interference-event` Specify events which will contribute to smart-rf wifi interference calculations
- `no` Negate a command or set its defaults
- `signature` Signature to configure
- `use` Set setting to use
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
rfs7000-37FABE(config-wips-policy-test)#
```

**Related Commands**

| `no` | Removes an existing WIPS policy |

**NOTE:** For more information on WIPS policy commands, see *Chapter 20, WIPS-POLICY*. 
4.1.97 wlan

Global Configuration Commands

Configures a Wireless Local Area Network (WLAN)

The following table lists WLAN configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>wlan</td>
<td>Creates a new wireless LAN and enters its configuration mode</td>
<td>page 4-410</td>
</tr>
<tr>
<td>wlan-mode</td>
<td>Summarizes WLAN configuration mode commands</td>
<td>page 4-413</td>
</tr>
<tr>
<td>commands</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.49 WLAN-Policy Config Commands
4.1.97.1 wlan

Configures a WLAN and enters its configuration mode. Use this command to modify an existing WLAN's settings.

A WLAN is a data-communications system that flexibly extends the functionality of a wired LAN. A WLAN links two or more computers or devices using spread-spectrum or Orthogonal Frequency Division Multiplexing (OFDM) modulation based technology. WLANs do not require lining up devices for line-of-sight transmission, and are thus, desirable for wireless networking. Roaming users can be handed off from one access point to another, like a cellular phone system. WLANs can therefore be configured around the needs of specific user groups, even when they are not in physical proximity.

WLANs can provide an abundance of services, including data communications (allowing mobile devices to access applications), e-mail, file, and print services or even specialty applications (such as guest access control and asset tracking).

Each WLAN configuration contains encryption, authentication and QoS policies and conditions for user connections. Connected access point radios transmit periodic beacons for each BSS. A beacon advertises the SSID, security requirements, supported data rates of the wireless network to enable clients to locate and connect to the WLAN.

WLANs are mapped to radios on each access point. A WLAN can be advertised from a single access point radio or can span multiple access points and radios. WLAN configurations can be defined to provide service to specific areas of a site. For example, a guest access WLAN may only be mapped to a 2.4 GHz radio in a lobby or conference room providing limited coverage, while a data WLAN is mapped to all 2.4 GHz and 5.0 GHz radios at the branch site to provide complete coverage.

The maximum number of WLANs supported by different devices is as follows:
- RFS4000 and RFS6000 wireless controllers – 32 WLANs
- RFS7000 wireless controller – 256 WLANs
- NX4500 and NX6500 series service platforms – 32 WLANs
- NX9000 series service platforms – 1000 WLANs
- Access Points – 16 WLANs

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

wlan {<WLAN-NAME>|containing <WLAN-NAME>}

Parameters

- wlan {<WLAN-NAME>|containing <WLAN-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wlan &lt;WLAN-NAME&gt;</td>
<td>Configures a new WLAN</td>
</tr>
<tr>
<td></td>
<td>• &lt;WLAN-NAME&gt; – Optional. Specify the WLAN name.</td>
</tr>
<tr>
<td></td>
<td>The WLAN name could be a logical representation of its coverage area (for example, engineering, marketing, etc.). The name cannot exceed 32 characters.</td>
</tr>
<tr>
<td>containing &lt;WLAN-NAME&gt;</td>
<td>Optional. Configures an existing WLAN’s settings</td>
</tr>
<tr>
<td></td>
<td>• &lt;WLAN-NAME&gt; – Specify a sub-string in the WLAN name. Use this parameter to filter a WLAN. This option allows you to select and enter the configuration mode of one or more WLANs.</td>
</tr>
</tbody>
</table>
Examples

rfs7000-37FABE(config)#wlan 1
rfs7000-37FABE(config-wlan-1)#!

Wireless LAN Mode commands:

- **accounting**
- **acl**
- **answer-broadcast-probes**
- **assoc-response**
- **association-list**
- **authentication-type**
- **bridging-mode**
- **broadcast-dhcp**
- **broadcast-ssid**
- **captive-portal-enforcement**
- **client-access**
- **client-client-communication**
- **client-load-balancing**
- **controller-assisted-mobility**
- **data-rates**
- **description**
- **downstream-group-addressed-forwarding**
- **dpi**
- **dynamic-vlan-assignment**
- **eap-types**
- **encryption-type**
- **enforce-dhcp**
- **fast-bss-transition**
- **http-analyze**
- **ip**
- **ipv6**
- **kerberos**
- **mac-authentication**
- **no**
- **nsight**
- **opendns**
- **protected-mgmt-frames**
- **proxy-arp-mode**
- **proxy-nd-mode**
- **qos-map**

- **Examples**
- **rfs7000-37FABE(config)#wlan 1**
- **rfs7000-37FABE(config-wlan-1)#?**

- **accounting**
  - Configure how accounting records are created for this wlan
- **acl**
  - Actions taken based on ACL configuration [packet drop being one of them]
- **answer-broadcast-probes**
  - Include this wlan when responding to probe requests that do not specify an SSID
- **assoc-response**
  - Association response threshold
- **association-list**
  - Configure the association list for the wlan
- **authentication-type**
  - The authentication type of this WLAN
- **bridging-mode**
  - Configure how packets to/from this wlan are bridged
- **broadcast-dhcp**
  - Configure broadcast DHCP packet handling
- **broadcast-ssid**
  - Advertise the SSID of the WLAN in beacons
- **captive-portal-enforcement**
  - Enable captive-portal enforcement on the wlan
- **client-access**
  - Enable client-access (normal data operations) on this wlan
- **client-client-communication**
  - Allow switching of frames from one wireless client to another on this wlan
- **client-load-balancing**
  - Configure load balancing of clients on this wlan
- **controller-assisted-mobility**
  - Enable controller assisted mobility to determine wireless clients' VLAN assignment
- **data-rates**
  - Specify the 802.11 rates to be supported on this wlan
- **description**
  - Configure a description of the usage of this wlan
- **downstream-group-addressed-forwarding**
  - Enable downstream group addressed forwarding of packets
- **dpi**
  - Deep-Packet-Inspection (Application Assurance)
- **dynamic-vlan-assignment**
  - Dynamic VLAN assignment configuration
- **eap-types**
  - Configure client access based on eap-type used for authentication
- **encryption-type**
  - Configure the encryption to use on this wlan
- **enforce-dhcp**
  - Drop packets from Wireless Clients with static IP address
- **fast-bss-transition**
  - Configure support for 802.11r Fast BSS Transition
- **http-analyze**
  - Enable HTTP URL analysis on the wlan
- **ip**
  - Internet Protocol (IP)
- **ipv6**
  - Internet Protocol version 6 (IPv6)
- **kerberos**
  - Configure kerberos authentication parameters
- **mac-authentication**
  - Configure mac-authentication related parameters
- **no**
  - Negate a command or set its defaults
- **nsight**
  - Nsight Server
- **opendns**
  - OpenDNS related config for this wlan
- **protected-mgmt-frames**
  - Protected Management Frames (IEEE 802.11w) related configuration (DEMO FEATURE)
- **proxy-arp-mode**
  - Configure handling of ARP requests with proxy-arp is enabled
- **proxy-nd-mode**
  - Configure handling of IPv6 ND requests with proxy-nd is enabled
- **qos-map**
  - Support the 802.11u QoS map element
The following example shows how to use the 'containing' keyword to enter the configuration mode of an existing WLAN:

```bash
rfs7000-37FABE(config)#wlan containing wlan1
rfs7000-37FABE(config-wlan-{containing: 'wlan1'})#```
### 4.1.97.2 wlan-mode commands

This section documents the WLAN configuration mode commands in detail. Use the (config) instance to configure WLAN related parameters. To navigate to this instance, use the following command:

```
<DEVICE>(config)#wlan <WLAN-NAME>
```

The following table summarizes WLAN configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>accounting</td>
<td>Defines a WLAN accounting configuration</td>
<td>page 4-416</td>
</tr>
<tr>
<td>acl</td>
<td>Defines the actions based on an ACL rule configuration</td>
<td>page 4-418</td>
</tr>
<tr>
<td>answer-broadcast-probes</td>
<td>Allows a WLAN to respond to probes for broadcast ESS</td>
<td>page 4-420</td>
</tr>
<tr>
<td>assoc-response</td>
<td>Configures a minimum receive signal strength indication (RSSI) value, below which the WLAN does not send a response to a client’s association request</td>
<td>page 4-421</td>
</tr>
<tr>
<td>association-list</td>
<td>Attaches an existing global association list to a WLAN</td>
<td>page 4-422</td>
</tr>
<tr>
<td>authentication-type</td>
<td>Sets a WLAN’s authentication type</td>
<td>page 4-423</td>
</tr>
<tr>
<td>bridging-mode</td>
<td>Configures how packets to/from this WLAN are bridged</td>
<td>page 4-425</td>
</tr>
<tr>
<td>broadcast-dhcp</td>
<td>Configures broadcast DHCP packet handling</td>
<td>page 4-426</td>
</tr>
<tr>
<td>broadcast-ssid</td>
<td>Advertises a WLAN’s SSID in beacons</td>
<td>page 4-427</td>
</tr>
<tr>
<td>captive-portal-enforcement</td>
<td>Configures a WLAN’s captive portal enforcement</td>
<td>page 4-428</td>
</tr>
<tr>
<td>client-access</td>
<td>Enables WLAN client access (normal data operations)</td>
<td>page 4-429</td>
</tr>
<tr>
<td>client-client-communication</td>
<td>Allows the switching of frames from one wireless client to another on a WLAN</td>
<td>page 4-430</td>
</tr>
<tr>
<td>client-load-balancing</td>
<td>Enables load balancing of WLAN clients</td>
<td>page 4-431</td>
</tr>
<tr>
<td>controller-assisted-mobility</td>
<td>Enables controller assisted mobility to determine wireless clients' VLAN assignment</td>
<td>page 4-433</td>
</tr>
<tr>
<td>data-rates</td>
<td>Specifies the 802.11 rates supported on the WLAN</td>
<td>page 4-434</td>
</tr>
<tr>
<td>description</td>
<td>Sets a WLAN’s description</td>
<td>page 4-437</td>
</tr>
<tr>
<td>downstream-group-addressed-forwarding</td>
<td>Enables forwarding of downstream packets addressed to a group</td>
<td>page 4-438</td>
</tr>
<tr>
<td>dpi</td>
<td>Enables extraction of metadata flows on the WLAN</td>
<td>page 4-439</td>
</tr>
<tr>
<td>dynamic-vlan-assignment</td>
<td>Configures dynamic VLAN assignment on this WLAN</td>
<td>page 4-440</td>
</tr>
</tbody>
</table>
### Table 4.50  WLAN-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>eap-types</td>
<td>Configures client access based on eap-type used for authentication</td>
<td>page 4-441</td>
</tr>
<tr>
<td>encryption-type</td>
<td>Sets a WLAN’s encryption type</td>
<td>page 4-443</td>
</tr>
<tr>
<td>enforce-dhcp</td>
<td>Drops packets from clients with a static IP address</td>
<td>page 4-444</td>
</tr>
<tr>
<td>fast-bss-transition</td>
<td>Configures support for 802.11r fast BSS transition on a WLAN</td>
<td>page 4-445</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Enables HTTP URL analysis on the WLAN</td>
<td>page 4-446</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IPv4 settings on this WLAN</td>
<td>page 4-448</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures IPv6 settings on this WLAN</td>
<td>page 4-449</td>
</tr>
<tr>
<td>kerberos</td>
<td>Configures Kerberos authentication parameters</td>
<td>page 4-450</td>
</tr>
<tr>
<td>mac-authentication</td>
<td>Configures MAC authentication parameters</td>
<td>page 4-452</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 4-453</td>
</tr>
<tr>
<td>nsight</td>
<td>Enables retention of guest client history in the NSight MongoDB database</td>
<td>page 4-457</td>
</tr>
<tr>
<td>opendns</td>
<td>Configures the device ID, which is embedded in each DNS query packet going out from an access point, wireless controller, or service platform to the OpenDNS server</td>
<td>page 4-458</td>
</tr>
<tr>
<td>protected-mgmt-frames</td>
<td>Enables and configures the WLAN's frame protection mode and security association</td>
<td>page 4-461</td>
</tr>
<tr>
<td>proxy-arp-mode</td>
<td>Enables the proxy ARP mode for ARP requests</td>
<td>page 4-463</td>
</tr>
<tr>
<td>proxy-nd-mode</td>
<td>Configures the proxy ND mode for this WLAN member clients as either strict or dynamic</td>
<td>page 4-464</td>
</tr>
<tr>
<td>qos-map</td>
<td>Enables support for 802.11u QoS map element and frames</td>
<td>page 4-465</td>
</tr>
<tr>
<td>radio-resource-measurement</td>
<td>Enables support for 802.11k radio resource measurement</td>
<td>page 4-466</td>
</tr>
<tr>
<td>radius</td>
<td>Configures RADIUS parameters</td>
<td>page 4-467</td>
</tr>
<tr>
<td>registration</td>
<td>Configures settings enabling dynamic registration of devices. Use this command to specify the mode of registration and to configure corresponding parameters.</td>
<td>page 4-469</td>
</tr>
<tr>
<td>relay-agent</td>
<td>Enables support for DHCP relay agent information (option 82) feature on this WLAN</td>
<td>page 4-471</td>
</tr>
<tr>
<td>shutdown</td>
<td>Auto shuts down a WLAN</td>
<td>page 4-473</td>
</tr>
<tr>
<td>ssid</td>
<td>Configures a WLAN’s SSID</td>
<td>page 4-475</td>
</tr>
<tr>
<td>t5-client-isolation</td>
<td>Disallows clients connecting to the WLAN to communicate with one another</td>
<td>page 4-476</td>
</tr>
<tr>
<td>t5-security</td>
<td>Configures T5 PowerBroadband security settings</td>
<td>page 4-477</td>
</tr>
<tr>
<td>time-based-access</td>
<td>Configures time-based client access</td>
<td>page 4-479</td>
</tr>
</tbody>
</table>
### Table 4.50 WLAN-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>use</td>
<td>Defines WLAN mode configuration settings</td>
<td>page 4-480</td>
</tr>
<tr>
<td>vlan</td>
<td>Sets VLAN assignment for a WLAN</td>
<td>page 4-483</td>
</tr>
<tr>
<td>vlan-pool-member</td>
<td>Adds a member VLAN to the pool of VLANs for a WLAN</td>
<td>page 4-484</td>
</tr>
<tr>
<td>wep128</td>
<td>Configures WEP128 parameters</td>
<td>page 4-486</td>
</tr>
<tr>
<td>wep64</td>
<td>Configures WEP64 parameters</td>
<td>page 4-488</td>
</tr>
<tr>
<td>wing-extensions</td>
<td>Enables support for WiNG specific extensions to 802.11</td>
<td>page 4-490</td>
</tr>
<tr>
<td>wireless-client</td>
<td>Configures the transmit power for wireless clients transmission</td>
<td>page 4-492</td>
</tr>
<tr>
<td>wpa-wpa2</td>
<td>Modifies TKIP and CCMP (WPA/WPA2) related parameters</td>
<td>page 4-495</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands applicable in the WLAN configuration mode</td>
<td>page 4-498</td>
</tr>
</tbody>
</table>
4.1.97.2.1 accounting

- *wlan-mode commands*

Defines the WLAN’s accounting configuration

Accounting is the method of collecting user data, such as start and stop times, executed commands (for example, PPP), number of packets and number of bytes received and transmitted. This data is sent to the security server for billing, auditing, and reporting purposes. Accounting enables wireless network administrators to track the services and network resources accessed and consumed by users. When enabled, this feature allows the network access server to report and log user activity to a RADIUS security server in the form of accounting records. Each accounting record is comprised of AV pairs and is stored on the access control server. The data can be analyzed for network management, client billing, and/or auditing. Accounting methods must be defined through AAA policies.

Accounting can be enabled and applied to access point, wireless controller, or service platform managed WLANs. Once enabled, it uniquely logs accounting events specific to the managed WLAN. Accounting logs contain information about the use of remote access services by users. This information is of great assistance in partitioning local versus remote users and how to best accommodate each. Remote user information can be archived to a location outside of the access point for periodic network and user permission administration.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
accounting [radius|syslog|wait-client-ip]
accounting [radius|wait-client-ip]
accounting syslog [host|mac-address-format]
accounting syslog host <IP/HOSTNAME> {port <1-65535>}
   {proxy-mode [none|through-controller|through-rf-domain-manager]}
accounting syslog mac-address-format [middle-hyphen|no-delim|pair-colon|pair-hyphen|quad-dot] case [lower|upper]
```

**Parameters**

- accounting [radius|wait-client-ip]
  
  **accounting radius** Enables support for WLAN RADIUS accounting messages. This option is disabled by default. When enabled, the WLAN uses an external RADIUS resource for accounting. **Note:** Use the `use > aaa-policy > <AAA-POLICY-NAME>` command to associate an appropriate AAA policy with this WLAN. This AAA policy should be existing and should define the accounting, authentication, and authorization parameters.

  **accounting wait-client-ip** Enables waiting for client’s IP before commencing the accounting procedure

- accounting syslog host <IP/HOSTNAME> {port <1-65535>}
  {proxy-mode [none|through-controller|through-rf-domain-manager]}

  **accounting syslog** Enables support for WLAN syslog accounting messages in standard syslog format (RFC 3164). This option is disabled by default.
<table>
<thead>
<tr>
<th><strong>GLOBAL CONFIGURATION COMMANDS 4-417</strong></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>command</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>host</strong></td>
<td>Configures a syslog destination hostname or IP address for accounting records</td>
</tr>
<tr>
<td><code>&lt;IP/HOSTNAME&gt;</code></td>
<td>Specify the IP address or name of the destination host.</td>
</tr>
<tr>
<td><strong>port</strong></td>
<td>Optional. Configures the syslog server’s UDP port (this port is used to connect to the server)</td>
</tr>
<tr>
<td><code>&lt;1-65535&gt;</code></td>
<td>Specify the port from 1 - 65535. Default port is 514.</td>
</tr>
<tr>
<td><strong>proxy-mode</strong></td>
<td>Optional. Configures the request proxying mode</td>
</tr>
<tr>
<td>[none]</td>
<td>Requests are directly sent to the server from the device</td>
</tr>
<tr>
<td>through-controller]</td>
<td>Proxies requests through the controller (access point, wireless controller, or service platform) configuring the device</td>
</tr>
<tr>
<td>through-rf-domain-manager]</td>
<td>Proxies requests through the local RF Domain manager</td>
</tr>
</tbody>
</table>

- `accounting syslog mac-address-format [middle-hyphen|no-delim|pair-colon|pair-hyphen|quad-dot] case [lower|upper]`

| **accounting syslog** | Enables support for WLAN syslog accounting messages |
| **mac-address-format** | Configures the MAC address format used in syslog messages |
| **middle-hyphen** | Configures the MAC address format with middle hyphen (AABBCC-DDEEFF) |
| **no-delim** | Configures the MAC address format without delimiters (AABBCCDDEEFF) |
| **pair-colon** | Configures the MAC address format with pair-colon delimiters (AA:BB:CC:DD:EE:FF) |
| **pair-hyphen** | Configures the MAC address format with pair-hyphen delimiters (AA-BB-CC-DD-EE-FF). This is the default setting. |
| **quad-dot** | Configures the MAC address format with quad-dot delimiters (AABB.CCDD.EEFF) |
| **case [lower|upper]** | The following keywords are common to all: |
| [lower] | Specifies MAC address case (upper or lower) |
| [lower] | Specifies MAC address is filled in lower case (for example, aa-bb-cc-dd-ee-ff) |
| [upper] | Specifies MAC address is filled in upper case (for example, AA-BB-CC-DD-EE-FF) |

**Examples**

```bash
rfs7000-37FABE(config-wlan-test)#accounting syslog host 172.16.10.4 port 2 proxy-mode none

rfs7000-37FABE(config-wlan-test)#show context wlan test ssid test bridging-mode tunnel encryption-type none authentication-type none accounting syslog host 172.16.10.4 port 2
```

**Related Commands**

| **no** | Disables sending of accounting message to the RADIUS server, disables syslog accounting, or disables waiting for client’s IP before sending accounting messages |
4.1.97.2.2 acl

wlan-mode commands

Defines the actions taken based on an ACL rule configuration

Use the `use > ip-access-list <IP-ACCESS-LIST-NAME>` command to associate an ACL with the WLAN. The ACL rule is determined by the associated ACL's configuration.

A firewall is a mechanism enforcing access control, and is considered a first line of defense in protecting proprietary information within the network. The means by which this is accomplished varies, but in principle, a firewall can be thought of as mechanisms allowing and denying data traffic in respect to administrator defined rules. For an overview of firewalls, see FIREWALL-POLICY.

WLANs use firewalls like Access Control Lists (ACLs) to filter/mark packets based on the WLAN from which they arrive, as opposed to filtering packets on layer 2 ports. An ACL contains an ordered list of Access Control Entries (ACEs). Each ACE specifies an action and a set of conditions (rules) a packet must satisfy to match the ACE. The order of conditions in the list is critical since filtering is stopped after the first match.

IP based firewall rules are specific to source and destination IP addresses and the unique rules and precedence orders assigned. Both IP and non-IP traffic on the same layer 2 interface can be filtered by applying both an IP ACL and a MAC.

Additionally, administrators can filter layer 2 traffic on a physical layer 2 interface using MAC addresses. A MAC Firewall rule uses source and destination MAC addresses for matching operations, where the result is a typical allow, deny or mark designation to WLAN packet traffic.

Keep in mind IP and non-IP traffic on the same layer 2 interface can be filtered by applying both an IP ACL and a MAC ACL to the interface.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
aclexceed-rate wireless-client-denied-traffic <0-1000000> {blacklist <0-86400>|
dissociate}
```

Parameters

- `acl exceed-rate wireless-client-denied-traffic <0-1000000> {blacklist <0-86400>|
dissociate}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
|acl exceed-rate| Sets the action taken based on an ACL rule configuration (for example, drop a packet)
- exceed-rate – Action is taken when the rate exceeds a specified value|
|wireless-client-denied-traffic <0-1000000>| Sets the action to deny traffic to the wireless client when the rate exceeds the specified value
- `<0-1000000>` – Specify a allowed rate threshold of disallowed traffic in packets/sec.
If enabled, this option allows an associated client, exceeding the thresholds configured for storm traffic, to be either de-authenticated or blacklisted depending on the action selected. This option is disabled by default.|
|blacklist <0-86400>| Optional. When enabled, sets the time interval, in seconds, to blacklist a wireless client.
- `<0-86400>` – Configures the blacklist duration from 0 - 86400 seconds. Offending clients are re-authenticated once the blacklist duration, configured here, has exceeded.|
|dissociate| Optional. When enabled, disassociates a wireless client|
### Examples

```bash
rfs7000-37FABE(config-wlan-test)#acl exceed-rate wireless-client-denied-traffic 20 disassociate

rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode tunnel
  encryption-type none
  authentication-type none
  accounting syslog host 172.16.10.4 port 2
  acl exceed-rate wireless-client-denied-traffic 20 disassociate
rfs7000-37FABE(config-wlan-test)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the action (de-authenticate or blacklist) to be taken when an associated client exceeds the thresholds configured for storm traffic</td>
</tr>
</tbody>
</table>
4.1.97.2.3 **answer-broadcast-probes**

* wlan-mode commands

Allows the WLAN to respond to probe requests that do not specify a SSID. These probes are for broadcast ESS. This feature is enabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
answer-broadcast-probes
```

**Parameters**

None

**Examples**

```plaintext
rfs7000-37FABE(config-wlan-1)#answer-broadcast-probes
rfs7000-37FABE(config-wlan-1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Does not allow this WLAN to respond to probe requests that do not specify a SSID</td>
</tr>
</tbody>
</table>
4.1.97.2.4 assoc-response

wlan-mode commands

Configures the deny-threshold and rssi-threshold values. These threshold values are considered when responding to a client's association/authentication request.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
assoc-response [deny-threshold <1-12>|rssi-threshold <-100--40>]

Parameters

- assoc-response [deny-threshold <1-12>|rssi-threshold <-100--40>]

<table>
<thead>
<tr>
<th>assoc-response</th>
<th>Configures the association response thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny-threshold</td>
<td>Configures the number of times association/authentication request, from a client, is ignored if the RSSI is less than the configured RSSI threshold. This option is disabled by default.</td>
</tr>
<tr>
<td>&lt;1-12&gt;</td>
<td>• &lt;1-12&gt; – Specify the deny-threshold from 1 - 12.</td>
</tr>
<tr>
<td>rssi-threshold</td>
<td>Configures an association response RSSI threshold value. If the RSSI is below the configured threshold value, the client's association/authentication request is ignored. This option is disabled by default.</td>
</tr>
<tr>
<td>&lt;-100--40&gt;</td>
<td>• rssi-threshold &lt;-100--40&gt; – Specify a value from -100 - -40 dBm.</td>
</tr>
</tbody>
</table>

Examples

```
nx9500-6C8809(config-wlan-test)#assoc-response rssi-threshold -60
nx9500-6C8809(config-wlan-test)#assoc-response deny-threshold 4
```

```
nx9500-6C8809(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode local
  encryption-type none
  authentication-type none
  assoc-response rssi-threshold -60
  assoc-response deny-threshold 4
  registration user group-name guest expiry-time 2000 agreement-refresh 14400
```

Related Commands

no

Removes the configured deny-threshold and rssi-threshold values
4.1.97.2.5 association-list

wlan-mode commands

Attaches an existing global association list with this WLAN. For more information on global association lists, see global-association-list.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

association-list global <GLOBAL-ASSO-LIST-NAME>

Parameters

- association-list global <GLOBAL-ASSO-LIST-NAME>

Examples

rfs4000-229D58(config-wlan-test)#association-list global my-clients

rfs4000-229D58(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode tunnel
  encryption-type none
  authentication-type none
  association-list global my-clients
rfs4000-229D58(config-wlan-test)#

Related Commands

no

Removes the global association list's association with this WLAN
### 4.1.97.2.6 authentication-type

Sets the WLAN's authentication type

**Supported in the following platforms:**
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
authentication-type [eap|eap-mac|eap-psk|kerberos|mac|none]
```

**Parameters**

- `authentication-type [eap|eap-mac|eap-psk|kerberos|mac|none]`

<table>
<thead>
<tr>
<th>authentication-type</th>
<th>Description</th>
</tr>
</thead>
</table>
| authentication-type | Configures a WLAN’s authentication type  
The authentication types are: EAP, EAP-MAC, EAP-PSK, Kerberos, MAC, and none. |
| eap                 | Configures EAP authentication (802.1X)  
EAP is the de-facto standard authentication method used to provide secure authenticated access to controller managed WLANs. EAP provides mutual authentication, secured credential exchange, dynamic keying and strong encryption. 802.1X EAP can be deployed with WEP, WPA or WPA2 encryption schemes to further protect user information forwarded over controller managed WLANs.  
The EAP process begins when an unauthenticated supplicant (client device) tries to connect with an authenticator (in this case, the authentication server). An access point passes EAP packets from the client to an authentication server on the wired side of the access point. All other packet types are blocked until the authentication server (typically, a RADIUS server) verifies the client’s identity.  
If using EAP authentication ensure that a AAA policy is mapped to the WLAN. |
| eap-mac             | Configures EAP or MAC authentication depending on client. (This setting is valid only with the None encryption type.  
EAP-MAC is useful when in a hotspot environment, as some clients support EAP and an administrator may want to authenticate based on just the MAC address of the device. |
| eap-psk             | Configures EAP authentication or pre-shared keys depending on client (This setting is only valid with Temporal Key Integrity Protocol (TKIP) or Counter Mode with Cipher Block Chaining Message Authentication Code Protocol (CCMP) encryption types).  
When using PSK with EAP, the controller sends a packet requesting a secure link using a pre-shared key. The controller and authenticating device must use the same authenticating algorithm and pass code during authentication. EAP-PSK is useful when transitioning from a PSK network to one that supports EAP.  
If using eap-psk authentication ensure that a AAA policy is mapped to the WLAN. |
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>kerberos</td>
<td>Configures Kerberos authentication (encryption will change to WEP128 if it's not already WEP128 or Keyguard) Kerberos (designed and developed by MIT) provides strong authentication for client/server applications using secret-key cryptography. Using Kerberos, a client must prove its identity to a server (and vice versa) across an insecure network connection. Once a client and server use Kerberos to validate their identity, they encrypt all communications to assure privacy and data integrity. Kerberos can only be used on the access point with 802.11b clients. Kerberos uses Network Time Protocol (NTP) for synchronizing the clocks of its Key Distribution Center (KDC) server(s).</td>
</tr>
<tr>
<td>mac</td>
<td>Configures MAC authentication (RADIUS lookup of MAC address) MAC is a device level authentication method used to augment other security schemes when legacy devices are deployed using static WEP. MAC authentication can be used for device level authentication by permitting WLAN access based on device MAC address. MAC authentication is typically used to augment WLAN security options that do not use authentication (such as static WEP, WPA-PSK and WPA2-PSK) MAC authentication can also be used to assign VLAN memberships, Firewall policies and time and date restrictions. MAC authentication can only identify devices, not users. If using mac authentication ensure that a AAA policy is mapped to the WLAN.</td>
</tr>
<tr>
<td>none</td>
<td>No authentication is used or the client uses pre-shared keys. This is the default value.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-wlan-test)#authentication-type eap
```

```
rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode tunnel
  encryption-type none
  authentication-type eap
  accounting syslog host 172.16.10.4 port 2
  acl exceed-rate wireless-client-denied-traffic 20 disassociate
```

**Related Commands**

```
no
```

Resets the authentication mode used with this WLAN to default (none/pre-shared keys)
### 4.1.97.2.7 bridging-mode

<table>
<thead>
<tr>
<th>bridging-mode</th>
<th>Configures how packets are bridged to and from a WLAN. The options are local and tunnel.</th>
</tr>
</thead>
<tbody>
<tr>
<td>local</td>
<td>Bridges packets between WLAN and local ethernet ports. This is the default mode.</td>
</tr>
<tr>
<td>tunnel</td>
<td>Tunnels packets to other devices (typically a wireless controller or service platform)</td>
</tr>
</tbody>
</table>

**Parameters**

- `bridging-mode [local|tunnel]`

**Syntax**

```
bridging-mode [local|tunnel]
```

**Examples**

- `rfs7000-37FABE(config-wlan-test)#bridging-mode local`
- `rfs7000-37FABE(config-wlan-test)#show context wlan test
ssid test
  bridging-mode local
  encryption-type none
  authentication-type eap
  accounting syslog host 172.16.10.4 port 2
  acl exceed-rate wireless-client-denied-traffic 20 disassociate
rfs7000-37FABE(config-wlan-test)#
```
4.1.97.2.8 broadcast-dhcp

**wlan-mode commands**

Configures broadcast DHCP packet handling parameters

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
broadcast-dhcp validate-offer
```

**Parameters**

- `broadcast-dhcp validate-offer`

**Examples**

```
rfs7000-37FABE(config-wlan-test)#broadcast-dhcp validate-offer
rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode local
  encryption-type none
  authentication-type eap
  accounting syslog host 172.16.10.4 port 2
  acl exceed-rate wireless-client-denied-traffic 20 disassociate
  broadcast-dhcp validate-offer
rfs7000-37FABE(config-wlan-test)#
```

**Related Commands**

```
no
```

Disables validation of the broadcast DHCP packet destination (a wireless client associated to the radio) before forwarding over the air.
### 4.1.97.2.9 broadcast-ssid

**wlan-mode commands**

Advertises the WLAN SSID in beacons. If a hacker tries to isolate and hack a SSID from a client, the SSID will display since the ESSID is in the beacon. This feature is enabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
broadcast-ssid
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-wlan-1)#broadcast-ssid
rfs7000-37FABE(config-wlan-1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables the broadcasting of the WLAN’s SSID in beacons</td>
</tr>
</tbody>
</table>
4.1.97.2.10 captive-portal-enforcement

**wlan-mode commands**

Configures the captive portal enforcement on this WLAN. When enabled, provides successfully authenticated guests temporary and restricted access to the network.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

captive-portal-enforcement  {fall-back}

**Parameters**
- captive-portal-enforcement  {fall-back}

<table>
<thead>
<tr>
<th>captive-portal-enforcement</th>
<th>Enables captive portal enforcement on a WLAN. This option is disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>fall-back</td>
<td>Optional. Enforces captive portal validation if WLAN authentication fails (applicable to EAP or MAC authentication only)</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-wlan-test)#captive-portal-enforcement fall-back

rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode local
  encryption-type none
  authentication-type eap
  accounting syslog host 172.16.10.4 port 2
  captive-portal-enforcement fall-back
  acl exceed-rate wireless-client-denied-traffic 20 disassociate
  broadcast-dhcp validate-offer
rfs7000-37FABE(config-wlan-test)#

**Related Commands**

| no  | Disables captive portal enforcement |
4.1.97.2.11 client-access

* wlan-mode commands

Enables WLAN client access (for normal data operations)

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

client-access

Parameters

None

Examples

rfs7000-37FABE(config-wlan-1)#client-access
rfs7000-37FABE(config-wlan-1)#

Related Commands

| no | Disables WLAN client access |
### 4.1.97.2.12 client-client-communication

#### wlan-mode commands

Allows frame switching from one client to another on a WLAN

This option is enabled by default. It allows clients to exchange packets with other clients. It does not necessarily prevent clients on other WLANs from sending packets to this WLAN, but as long as this setting is also disabled on that WLAN, clients are not permitted to interoperate.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

client-client-communication

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-wlan-1)#client-client-communication
rfs7000-37FABE(config-wlan-1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables frame switching from one client to another on a WLAN</td>
</tr>
</tbody>
</table>
4.1.97.2.13 client-load-balancing

wlan-mode commands

Enforces client load balancing on a WLAN's access point radios. AP6522, AP6532, AP6562, AP81XX, and AP82XX models can support 256 clients per access point. AP6511 and AP6521 models can support up to 128 clients per access point. When enforced, loads are balanced by ignoring association and probe requests. Probe and association requests are not responded to, forcing a client to associate with another access point radio.

This feature is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

client-load-balancing {allow-single-band-clients [2.4ghz|5ghz]|band-discovery-intvl <0-10000>|capability-ageout-time <0-10000>}

client-load-balancing {max-probe-req [2.4ghz|5ghz]|probe-req-intvl <0-10000>}

Parameters

- client-load-balancing {allow-single-band-clients [2.4ghz|5ghz]|band-discovery-intvl <0-10000>|capability-ageout-time <0-10000>}

### client-load-balancing Configures WLAN client load balancing

<table>
<thead>
<tr>
<th>client-load-balancing</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>allow-single-band-clients [2.4ghz</td>
<td>5ghz]</td>
</tr>
<tr>
<td>band-discovery-intvl &lt;0-10000&gt;</td>
<td>Optional. Configures the interval to discover a client's band capability before connection</td>
</tr>
<tr>
<td>capability-ageout-time &lt;0-10000&gt;</td>
<td>Optional. Configures a client's capability ageout interval. This is the time for which a client's capabilities are retained in the device's internal table. Once this time is exceeded the client's capabilities are aged out.</td>
</tr>
<tr>
<td>max-probe-req [2.4ghz</td>
<td>5ghz] &lt;0-10000&gt;</td>
</tr>
</tbody>
</table>

- max-probe-req [2.4ghz|5ghz] <0-10000> | Optional. Configures client probe request interval limits for device association |
- 2.4ghz – Configures maximum client probe requests on 2.4 GHz radios |
- 5ghz – Configures maximum client probe requests on 5.0 GHz radios |
- <0-10000> – Specify a client probe request threshold from 0 - 10000. The default for both 2.4 and 5.0 GHz radios is 60.
Examples

rfs7000-37FABE(config-wlan-test)#client-load-balancing band-discovery-intvl 2
rfs7000-37FABE(config-wlan-test)#client-load-balancing probe-req-intvl 5ghz 5
rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode local
  encryption-type none
  authentication-type eap
  accounting syslog host 172.16.10.4 port 2
  client-load-balancing probe-req-intvl 5ghz 5
  client-load-balancing band-discovery-intvl 2
  captive-portal-enforcement fall-back
  acl exceed-rate wireless-client-denied-traffic 20 disassociate
  broadcast-dhcp validate-offer
rfs7000-37FABE(config-wlan-test)#

Related Commands

| no | Disables client load balancing on a WLAN’s access point radios |
4.97.2.14 controller-assisted-mobility

wlan-mode commands

Enables controller or service platform assisted mobility to determine a wireless client’s VLAN assignment. When enabled, a controller or service platform’s mobility database is used to assist in roaming between RF Domains. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
controller-assisted-mobility

Parameters
None

Examples
rfs4000-229D58(config-wlan-test)#controller-assisted-mobility

rfs4000-229D58(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode tunnel
  encryption-type none
  authentication-type none
  controller-assisted-mobility
rfs4000-229D58(config-wlan-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables controller or service platform assisted mobility to determine a wireless client’s VLAN assignment</td>
</tr>
</tbody>
</table>
4.1.97.2.15  data-rates

wlan-mode commands

Specifies the 802.11 rates supported on a WLAN

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

data-rates [2.4GHz|5GHz]

data-rates 2.4GHz [b-only|bg|bgn|custom|default|g-only|gn]

data-rates 2.4GHz custom [1|11|12|18|2|24|36|48|5.5|54|6|9|basic-1|basic-11|basic-12|basic-18|basic-2|basic-24|basic-36|basic-48|basic-5.5|basic-54|basic-6|basic-9|basic-mcs-1s|mcs-1s|mcs-2s|mcs-3s]

data-rates 5GHz [a-only|an|custom|default]

data-rates 5GHz custom [12|18|24|36|48|54|6|9|basic-1|basic-11|basic-12|basic-18|basic-2|basic-24|basic-36|basic-48|basic-5.5|basic-54|basic-6|basic-9|basic-mcs-1s|mcs-1s|mcs-2s|mcs-3s]

Parameters

- data-rates 2.4GHz [b-only|bg|bgn|default|g-only|gn]
  - **data-rates** Specifies the 802.11 rates supported when mapped to a 2.4 GHz radio
    - **b-only** Uses rates that support only 11b clients
    - **bg** Uses rates that support both 11b and 11g clients
    - **bgn** Uses rates that support 11b, 11g and 11n clients
    - **default** Uses the default rates configured for a 2.4 GHz radio
    - **g-only** Uses rates that support operation in 11g only
    - **gn** Uses rates that support 11g and 11n clients

- data-rates 5GHz [a-only|an|default]
  - **data-rates** Specifies the 802.11 rates supported when mapped to a 5.0 GHz radio
    - **a-only** Uses rates that support operation in 11a only
    - **an** Uses rates that support 11a and 11n clients
    - **default** Uses default rates configured for a 5.0 GHz

- data-rates [2.4GHz|5GHz] custom [1|11|12|18|2|24|36|48|5.5|54|6|9|basic-1|basic-11|basic-12|basic-18|basic-2|basic-24|basic-36|basic-48|basic-5.5|basic-54|basic-6|basic-9|basic-mcs-1s|mcs-1s|mcs-2s|mcs-3s]

- data-rates [2.4GHz|5GHz] Specifies the 802.11 rates supported when mapped to a 2.4 GHz or 5.0 GHz radio
**custom**

Configures a data rates list by specifying each rate individually. Use 'basic-' prefix before a rate to indicate it is used as a basic rate (For example, 'data-rates custom basic-1 basic-2 5.5 11').

The data-rates for 2.4 GHz and 5.0 GHz channels are the same with a few exceptions. The 2.4 GHz channel has a few extra data rates: 1, 11, 2, and 5.5.

<table>
<thead>
<tr>
<th>1,11,2,5.5</th>
</tr>
</thead>
</table>

The following data rates are specific to the 2.4 GHz channel:

- 1 – 1-Mbps
- 11 – 11-Mbps
- 2 – 2-Mbps
- 5.5 – 5.5-Mbps

<table>
<thead>
<tr>
<th>[12,18,24,36,48,54,6,9,basic-1,basic-11, basic-12,basic-18, basic-2,basic-36, basic-48,basic-5.5, basic-54,basic-6, basic-9, basic-mcs-1s, mcs-1s,mcs2s, mcs-3s]</th>
</tr>
</thead>
</table>

The following data rates are common to both the 2.4 GHz and 5.0 GHz channels:

- 12 – 12 Mbps
- 18 – 18-Mbps
- 24 – 24 Mbps
- 36 – 36-Mbps
- 48 – 48-Mbps
- 54 – 54-Mbps
- 6 – 6-Mbps
- 9 – 9-Mbps
  - basic-1 – basic 1-Mbps
  - basic-11 – basic 11-Mbps
  - basic-12 – basic 12-Mbps
  - basic-18 – basic 18-Mbps
  - basic-2 – basic 2-Mbps
  - basic-36 – basic 36-Mbps
  - basic-48 – basic 48-Mbps
  - basic-5.5 – basic 5.5-Mbps
  - basic-54 – basic 54-Mbps
  - basic-6 – basic 6-Mbps
  - basic-9 – basic 9-Mbps
  - basic-mcs-1s – Modulation and coding scheme data rates for 1 Spatial Stream
  - mcs-1s – Applicable to 1-spatial stream data rates
  - mcs-2s – Applicable to 2-spatial stream data rates
  - mcs-3s – Applicable to 3-spatial stream data rates
Examples
rfs7000-37FABE(config-wlan-test)#data-rates 2.4GHz gn
rfs7000-37FABE(config-wlan-test)#show context wlan test
ssid test bridging-mode local encryption-type none
authentication-type eap accounting syslog host 172.16.10.4 port 2
data-rates 2.4GHz gn
client-load-balancing probe-req-intvl 5ghz 5
client-load-balancing band-discovery-intvl 2
captive-portal-enforcement fall-back
acl exceed-rate wireless-client-denied-traffic 20 disassociate
broadcast-dhcp validate-offer
rfs7000-37FABE(config-wlan-test)#

Related Commands
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets the 802.11 data rates supported on a WLAN for the 2.4 GHz or 5.0 GHz radios</td>
</tr>
</tbody>
</table>
### 4.1.97.2.16 description

**wlan-mode commands**

Defines the WLAN description

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

description <LINE>

**Parameters**

- description <LINE>

<table>
<thead>
<tr>
<th>&lt;LINE&gt;</th>
<th>Specify a WLAN description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The WLAN's description should help differentiate it from others with similar configurations. The description should not exceed 64 characters.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-wlan-test)#description TestWLAN

rfs7000-37FABE(config-wlan-test)#show context

wlan test
description TestWLAN
ssid test
bridging-mode local
encryption-type none
authentication-type eap
accounting syslog host 172.16.10.4 port 2
data-rates 2.4GHz gn
client-load-balancing probe-req-intvl 5ghz 5
client-load-balancing band-discovery-intvl 2
 captive-portal-enforcement fall-back
acl exceed-rate wireless-client-denied-traffic 20 disassociate
broadcast-dhcp validate-offer
rfs7000-37FABE(config-wlan-test)#

**Related Commands**

| no | Removes a WLAN's configured description |
4.1.97.2.17 downstream-group-addressed-forwarding

* wlan-mode commands

Enables forwarding of downstream broadcast/multicast (BC/MC) packets to a group on this WLAN. This feature is enabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

downstream-group-addressed-forwarding

**Parameters**

None

**Examples**

rfs4000-229D58(config-wlan-test)#downstream-group-addressed-forwarding

rfs4000-229D58(config-wlan-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables forwarding of downstream BCMC packets to a group on this WLAN</td>
</tr>
</tbody>
</table>
4.1.97.2.18 dpi

**wlan-mode commands**

Enables extraction of metadata flows on the WLAN. The *Deep Packet Inspection* (DPI) engine, integrated in the WING devices, has the capability of identifying 400 and more applications and application categories. However, in large deployments where a large number of users are guests, the DPI engine is inadequate in detecting applications or Websites not included in its database. This gap in the DPI application database is overcome by enabling extraction of AVC metadata flows. When enabled this option allows tracking of all HTTP/SSL websites accessed by clients (internal and/or guests) and monitoring of voice-video calls.

Supported in the following platforms:

- Access Points — AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

dpi metadata [http|ssl|voice-video]

**Parameters**

- dpi metadata [http|ssl|voice-video]

<table>
<thead>
<tr>
<th>dpi metadata</th>
<th>Enables extraction of the following metadata flows:</th>
</tr>
</thead>
<tbody>
<tr>
<td>http</td>
<td>Extracts HTTP metadata flows. When enabled, administrators can track HTTP Websites accessed by both internal and guest clients and visualize HTTP data usage, hits, active time and total clients on the NSight application’s dashboard. This setting is disabled by default.</td>
</tr>
<tr>
<td>ssl</td>
<td>Extracts SSL metadata flows. When enabled, administrators can track SSL Websites accessed by both internal and guest clients and visualize SSL data usage, hits, active time and total clients on the NSight application’s dashboard. This setting is disabled by default.</td>
</tr>
<tr>
<td>voice-video</td>
<td>Extracts voice and video metadata flows. When enabled, voice and video calls can be tracked by extracting parameters, such as packets transferred and lost, jitter, and application name. Most Enterprise VoIP applications like facetime, skype for business and VoIP terminals can be monitored for call quality and visualized on the NSight dashboard in manner similar to HTTP and SSL. Call quality and metrics can only be determined from calls established unencrypted. This setting is disabled by default.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-wlan-test)#dpi metadata http
rfs7000-37FABE(config-wlan-test)#dpi metadata ssl
rfs7000-37FABE(config-wlan-test)#dpi metadata voice-video
```

```
rfs7000-37FABE(config-wlan-test)#show context
wlan test
ssid test
bridging-mode tunnel
encryption-type none
authentication-type none
dpi metadata voice-video
dpi metadata http
dpi metadata ssl
```

**Related Commands**

| no | Disables extraction of metadata flows on the WLAN |
4.1.97.2.19 dynamic-vlan-assignment

* wlan-mode commands

Enables dynamic VLAN assignment on this WLAN, and adds or removes VLANs for the selected WLAN. Configure this feature to allow an override to the WLAN configuration. If, as part of the authentication process, the RADIUS server returns a client's VLAN-ID in a RADIUS Access-Accept packet, and this feature is enabled, all client traffic is forward on that VLAN. If disabled, the RADIUS server returns VLAN-ID is ignored and the WLAN's VLAN configuration is used. For more information, see *vlan*. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
dynamic-vlan-assignment allowed-vlans <VLAN-ID>
```

**Parameters**

- `dynamic-vlan-assignment allowed-vlans <VLAN-ID>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dynamic-vlan-assignment</td>
<td>Enables dynamic VLAN assignment and configures a list of VLAN IDs or VLAN alias allowed access to the WLAN</td>
</tr>
<tr>
<td>allowed-vlans</td>
<td>&lt;VLAN-ID&gt; Specify the list of VLAN IDs or the VLAN alias names. For example, 10-20, 25, 30-35, $guest. For information on VLAN aliases, see alias.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-wlan-test)#dynamic-vlan-assignment allowed-vlans 10-20
```

```
rfs4000-229D58(config-wlan-test)#show context
wlan test
ssid test
bridging-mode tunnel
encryption-type none
authentication-type none
dynamic-vlan-assignment allowed-vlans 10-20
rfs4000-229D58(config-wlan-test)#
```

**Related Commands**

- `no` Disables dynamic VLAN assignment on this WLAN
4.1.97.2.20 eap-types

wlan-mode commands

Configures client access based on the EAP type used

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
eap-types [allow|deny] [aka|all|fast|peap|sim|tls|ttls]
{aka|all|fast|peap|sim|tls|ttls}
```

Parameters

- eap-types [allow|deny] [aka|all|fast|peap|sim|tls|ttls]
{aka|all|fast|peap|sim|tls|ttls}

| eap-types [allow|deny] | Configures a list of allowed or denied EAP types |
|------------------------|--------------------------------------------------|
| allow                  | Configures a list of EAP types allowed for WLAN client authentication |
| deny                   | Configures a list of EAP types not allowed for WLAN client authentication |

| [aka|all|fast|peap|sim|tls|ttls] | The following EAP types are common to the ‘allow’ and ‘deny’ keywords: |
|--------------------------|------------------------------------------------------------------------|
| aka                      | Configures EAP Authentication and Key Agreement (AKA) and EAP-AKA’ (AKA Prime). EAP-AKA is one of the methods in the EAP authentication framework. It uses Universal Mobile Telecommunications System (UMTS) and Universal Subscriber Identity Module (USIM) for client authentication and key distribution. |
| all                      | Allows or denies usage of all EAP types on the WLAN. This is the default setting. |
| peap                     | Configures Protected Extensible Authentication Protocol (PEAP). PEAP or Protected EAP uses encrypted and authenticated TLS tunnel to encapsulate EAP. |
| sim                      | Configures EAP Subscriber Identity Module (SIM). EAP-SIM uses Global System for Mobile Communications (GSMC) SIM for client authentication and key distribution. |
| tls                      | Configures EAP Transport Layer Security (TLS). EAP-TLS is an EAP authentication method that uses PKI to communicate with a RADIUS server or any other authentication server. |
| ttls                     | Configures Tunneled Transport Layer Security (TTLS). EAP-TTLS is an extension of TLS. Unlike TLS, TTLS does not require every client to generate and install a CA- signed certificate. |

Note: These options are recursive, and more than one EAP type can be selected. The selected options are added to the allowed or denied EAP types list.
Examples

rfs7000-37FABE(config-wlan-test)#eap-types allow fast sim tls

rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode tunnel
  encryption-type none
  authentication-type none
  eap-types allow fast sim tls
rfs7000-37FABE(config-wlan-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Reverts to default setting - eap-types allow all</td>
</tr>
</tbody>
</table>
4.1.97.21 encryption-type

Sets a WLAN’s encryption type

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
encryption-type [ccmp|keyguard|none|tkip-ccmp|wep128|web128-keyguard|wep64]

Parameters
- encryption-type [ccmp|keyguard|none|tkip-ccmp|wep128|web128-keyguard|wep64]

<table>
<thead>
<tr>
<th>encryption-type</th>
<th>Configures the WLAN’s data encryption parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>ccmp</td>
<td>Configures Advanced Encryption Standard (AES) Counter Mode CBC-MAC Protocol (AES-CCM/CCMP)</td>
</tr>
<tr>
<td>keyguard</td>
<td>Configures Keyguard-MCM (Mobile Computing Mode)</td>
</tr>
<tr>
<td>none</td>
<td>No encryption used. This is the default setting.</td>
</tr>
<tr>
<td>tkip-ccmp</td>
<td>Configures the TKIP and AES-CCM/CCMP encryption modes</td>
</tr>
<tr>
<td>wep128</td>
<td>Configures WEP with 128 bit keys</td>
</tr>
<tr>
<td>wep128-keyguard</td>
<td>Configures WEP128 as well as Keyguard-MCM encryption modes</td>
</tr>
<tr>
<td>wep64</td>
<td>Configures WEP with 64 bit keys. A WEP64 configuration is insecure when two WLANs are mapped to the same VLAN, and one uses no encryption while the other uses WEP.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-wlan-test)#encryption-type tkip-ccmp
rfs7000-37FABE(config-wlan-test)#show context
wlan test
description TestWLAN
ssid test
bridging-mode local
clear encryption-type
clear authentication-type
clear accounting
clear data-rates
clear client-load-balancing
clear captive-portal-enforcement
clear acl exceed-rate
clear broadcast-dhcp

Related Commands
- no | Resets the WLAN’s encryption type to default (none)
4.1.97.2.22  

**enforce-dhcp**

- **wlan-mode commands**

Enables dropping of packets from clients with a static IP address. This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

enforce-dhcp

**Parameters**

None

**Examples**

```bash
rfs7000-37FABE(config-wlan-test)#enforce-dhcp
rfs7000-37FABE(config-wlan-test)#show context wlan test
description TestWLAN
ssid test
bridging-mode local
encryption-type tkip-ccmp
authentication-type eap
accounting syslog host 172.16.10.4 port 2
data-rates 2.4GHz gn
client-load-balancing probe-req-intvl 5ghz 5
client-load-balancing band-discovery-intvl 2
captive-portal-enforcement fall-back
capture-portal-enforcement fall-back
acl exceed-rate wireless-client-denied-traffic 20 disassociate
enforce-dhcp
broadcast-dhcp validate-offer
rfs7000-37FABE(config-wlan-test)#
```

**Related Commands**

| no          | Disables dropping of packets from clients with a static IP address |
4.1.97.23 fast-bss-transition

wlan-mode commands

Enables support for 802.11r Fast-BSS Transition (FT) on the selected WLAN. This feature is disabled by default. 802.11r is an attempt to undo the burden that security and QoS added to the handoff process, and restore it back to an original four message exchange process. The central application for the 802.11r standard is VOIP using mobile phones within wireless Internet networks. 802.11r FT redefines the security key negotiation protocol, allowing parallel processing of negotiation and requests for wireless resources.

Enabling FT standards provides wireless clients fast, secure and seamless transfer from one base station to another, ensuring continuous connectivity.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
fast-bss-transition {over-ds}

Parameters
- fast-bss-transition {over-ds}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>fast-bss-transition</td>
<td>Enables 802.11r FT support on this WLAN</td>
</tr>
<tr>
<td>over-ds</td>
<td>• over-ds – Optional. Enables 802.11r client roaming over the Distribution System (DS). When enabled, all client communication with the target AP is via the current AP. This communication, carried in FT action frames, is first sent by the client to the current AP, then forwarded to the target AP through the controller.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-wlan-test)#fast-bss-transition

rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  vlan 1
  bridging-mode tunnel
  encryption-type none
  authentication-type none
  fast-bss-transition
rfs7000-37FABE(config-wlan-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables support for 802.11r Fast-BSS Transition (FT) on a WLAN</td>
</tr>
</tbody>
</table>
4.1.97.2.24 http-analyze

* wlan-mode commands *

Enables HTTP URL analysis on the WLAN

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
http-analyze [filter|syslog]
http-analyze filter [images|post|query-string]
http-analyze syslog host <IP/HOSTNAME> {port <1-65535>} {proxy-mode [none|through-controller|through-rf-domain-manager]}

Parameters
- http-analyze filter [images|post|query-string]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>filter</td>
<td>Filters URLs, based on the parameters set, before forwarding them</td>
</tr>
<tr>
<td>images</td>
<td>Filters out URLs referring to images (does not forward URL requesting images)</td>
</tr>
<tr>
<td>post</td>
<td>Filters out URLs requesting POST (does not forward POST requests). This option is disabled by default.</td>
</tr>
<tr>
<td>query-string</td>
<td>Removes query strings from URLs before forwarding them (forwards requests and no data). This option is disabled by default.</td>
</tr>
</tbody>
</table>

- http-analyze syslog host <IP/HOSTNAME> {port <1-65535>} {proxy-mode [none|through-controller|through-rf-domain-manager]}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>syslog host</td>
<td>Forwards client and URL information to a syslog server</td>
</tr>
<tr>
<td>port &lt;1-65535&gt;</td>
<td>Optional. Specifies the UDP port to connect to the syslog server from 1-65535</td>
</tr>
<tr>
<td>proxy-mode</td>
<td>Optional. Specifies if the request is to be proxied through another device</td>
</tr>
<tr>
<td>[none]</td>
<td>• none – Requests are sent directly to syslog server from device</td>
</tr>
<tr>
<td>through-controller</td>
<td>• through-controller – Proxies requests, to the syslog server, through the controller configuring the device</td>
</tr>
<tr>
<td>through-rf-domain-manager</td>
<td>• through-rf-domain-manager – Proxies requests, to the syslog server, through the local RF Domain manager</td>
</tr>
</tbody>
</table>

Examples
rfs4000-229D58(config-wlan-test)#http-analyze syslog host 192.168.13.10 port 21 proxy-mode through-controller
rfs4000-229D58(config-wlan-test)#show context
  wlan test
  ssid test
  bridging-mode tunnel
  encryption-type none
  authentication-type none
  http-analyze syslog host 192.168.13.10 port 21 proxy-mode through-controller
rfs4000-229D58(config-wlan-test)#
Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables HTTP URL analysis on the WLAN</td>
</tr>
</tbody>
</table>
### 4.1.97.2.25 ip

#### wlan-mode commands

Configures Internet Protocol (IP) settings

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
ip [arp|dhcp]

ip arp [header-mismatch-validation|trust]

ip dhcp trust
```

**Parameters**

- **ip arp [header-mismatch-validation|trust]**
  - `header-mismatch-validation`: Verifies mismatch of source MAC address in the ARP and Ethernet headers. This option is enabled by default.
  - `trust`: Sets ARP responses as trusted for a WLAN/range. This option is disabled by default.

- **ip dhcp trust**
  - Configures the IP settings for DHCP packets
  - Sets DHCP responses as trusted for a WLAN/range. This option is disabled by default.

**Examples**

```plaintext
rfs7000-37FABE(config-wlan-test)#ip dhcp trust

rfs7000-37FABE(config-wlan-test)#show context wlan test
description TestWLAN
ssid test
bridging-mode local
encryption-type tkip-ccmp
authentication-type eap
accounting syslog host 172.16.10.4 port 2
data-rates 2.4GHz gn
client-load-balancing probe-req-intvl 5ghz 5
client-load-balancing band-discovery-intvl 2
captive-portal-enforcement fail-back
ip dhcp trust
   acl exceed-rate wireless-client-denied-traffic 20 disassociate
   enforce-dhcp
   broadcast-dhcp validate-offer
   http-analyze controller
rfs7000-37FABE(config-wlan-test)#
```

**Related Commands**

- **no**
  - Resets IP ARP or DHCP trust parameters to default. ARP trust is disabled, ARP mismatch verification is enabled, or DHCP trust is disabled.
### 4.1.97.2.26 ipv6

#### 4.1.97.2.26.1 wlan-mode commands

Sets the DHCPv6 and ICMPv6 neighbor discovery (ND) components for this WLAN

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

- `ipv6 [dhcpv6|nd]`
- `ipv6 dhcpv6 trust`
- `ipv6 nd [header-mismatch-validation|raguard|trust]`

#### Parameters

- **ipv6 dhcpv6 trust**
  - Enables DHCPv6 trust state for DHCPv6 responses on this WLAN. When enabled, all DHCPv6 responses received on this WLAN are trusted and forwarded. This option is disabled by default.

- **ipv6 nd [header-mismatch-validation|raguard|trust]**
  - Sets the IPv6 ND settings for this WLAN
  - **header-mismatch-validation**
    - Checks for mismatch of source MAC address in the ICMPv6 ND message and Ethernet header (link layer option). This option is enabled by default.
  - **raguard**
    - Allows redirection of router advertisements (RAs) and ICMPv6 packets originating on this WLAN. This option is disabled by default.
  - **trust**
    - Enables trust state for ND requests received on this WLAN. When enabled, all ND requests on an IPv6 firewall, on this WLAN, are trusted. This option is disabled by default.

#### Examples

- `rfs7000-37FABE(config-wlan-test)#ipv6 dhcpv6 trust`
- `rfs7000-37FABE(config-wlan-test)#ipv6 nd trust`
- `rfs7000-37FABE(config-wlan-test)#show context wlan test`
  - `ssid test`
  - `vlan 1`
  - `bridging-mode tunnel`
  - `encryption-type none`
  - `authentication-type none`
  - `ipv6 dhcpv6 trust`
  - `ipv6 nd trust`
- `rfs7000-37FABE(config-wlan-test)#`

#### Related Commands

- **no**
  - Resets IPv6 ND or DHCPv6 trust parameters to default. ND request trust is disabled, ND header mismatch verification is enabled, ND RA and ICMPv6 redirection is disabled, or DHCPv6 trust is disabled.
4.1.97.2.27 **kerberos**

Configure Kerberos authentication parameters on a WLAN.

Kerberos (designed and developed by MIT) provides strong authentication for client/server applications using secret-key cryptography. Using Kerberos, a client must prove its identity to a server (and vice versa) across an insecure network connection.

Once a client and server use Kerberos to validate their identity, they encrypt all communications to assure privacy and data integrity. Kerberos can only be used on the access point with 802.11b clients. Kerberos uses **Network Time Protocol (NTP)** for synchronizing the clocks of its **Key Distribution Center (KDC)** server(s).

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX5600, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
kerberos [password|realm|server]
kerberos password [0 <LINE>|2 <LINE>|<LINE>]
kerberos realm <REALM>
kerberos server [primary|secondary|timeout]
kerberos server [primary|secondary] host <IP/HOSTNAME> {port <1-65535>}
kerberos server timeout <1-60>
```

**Parameters**
- **kerberos password [0 <LINE>|2 <LINE>|<LINE>]**
  - Configures a Kerberos KDC server password. The password should not exceed 127 characters. The password options are:
    - 0 <LINE> – Configures a clear text password
    - 2 <LINE> – Configures an encrypted password
    - <LINE> – Specify the password.

- **kerberos realm <REALM>**
  - Configures a Kerberos KDC server realm. The REALM should not exceed 127 characters.

- **kerberos server [primary|secondary] host <IP/HOSTNAME> {port <1-65535>**}
  - Configures a Kerberos KDC server host. The host name or IP address can be specified along with an optional port number.

- **kerberos server timeout <1-60>**
  - Configures a timeout period for Kerberos server communication.

---

**Table:**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>kerberos</td>
<td>Configures a WLAN’s Kerberos authentication parameters. The parameters are: password, realm, and server.</td>
</tr>
</tbody>
</table>
| password | Configures a Kerberos KDC server password. The password should not exceed 127 characters. The password options are: 
  - 0 <LINE> – Configures a clear text password
  - 2 <LINE> – Configures an encrypted password
  - <LINE> – Specify the password. |
<p>| realm &lt;REALM&gt; | Configures a Kerberos KDC server realm. The REALM should not exceed 127 characters. |
| kerberos server [primary|secondary] host &lt;IP/HOSTNAME&gt; {port &lt;1-65535&gt; | Configures a Kerberos KDC server host. The host name or IP address can be specified along with an optional port number. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>kerberos server timeout</td>
<td>Modifies the Kerberos KDC server’s timeout parameters</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-60&gt; – Specifies the wait time for a response from the Kerberos KDC server before retrying. Specify a value from 1 - 60 seconds.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-wlan-test)#kerberos server timeout 12
rfs7000-37FABE(config-wlan-test)#kerberos server primary host 172.16.10.2 port 88
```

```
rfs7000-37FABE(config-wlan-test)#show context
wlan test
description TestWLAN
ssid test
bridging-mode local
encryption-type tkip-ccmp
authentication-type eap
kerberos server timeout 12
kerberos server primary host 172.16.10.2
accounting syslog host 172.16.10.4 port 2
data-rates 2.4GHz gn
client-load-balancing probe-req-intvl 5ghz 5
client-load-balancing band-discovery-intvl 2
captive-portal-enforcement fall-back
ip dhcp trust
acl exceed-rate wireless-client-denied-traffic 20 disassociate
enforce-dhcp
broadcast-dhcp validate-offer
http-analyze controller
rfs7000-37FABE(config-wlan-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes Kerberos authentication related parameters on a WLAN</td>
</tr>
</tbody>
</table>
4.1.97.2.28  **mac-authentication**

**wlan-mode commands**

Enables MAC authentication. When enabled, the system uses cached credentials (RADIUS server lookups are skipped) to authenticate clients.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

mac-authentication [cached-credentials|enforce-always]

**Parameters**

- **mac-authentication [cached-credentials|enforce-always]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mac-authentication</td>
<td>Enables MAC authentication on this WLAN and configures related parameters</td>
</tr>
<tr>
<td>cached-credentials</td>
<td>Uses cached credentials to skip RADIUS lookups. This option is disabled by default.</td>
</tr>
<tr>
<td>enforce-always</td>
<td>Enforces MAC authentication on this WLAN. When enabled, MAC authentication is enforced, each time a client logs in, even when the authentication type specified (using the authentication-type command) is not MAC authentication. This option is disabled by default.</td>
</tr>
</tbody>
</table>

**Examples**

rfs4000-229D58(config-wlan-test)#mac-authentication cached-credentials  
rfs4000-229D58(config-wlan-test)#

**Related Commands**

- **no**  
  Disables MAC authentication related parameters: Disables use of cached credentials to skip RADIUS lookups, or disables enforcement of MAC authentication on this WLAN.
4.1.97.2.29  no

wlan-mode commands

Negates WLAN mode commands and reverts values to their default

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax


no accounting [radius|syslog|wait-client-ip]

no acl exceed-rate wireless-client-denied-traffic


no assoc-response [deny-threshold|rssi-threshold]

no http-analyze {filter|syslog}

no http-analyze {filter {images|post|query-string}}

no ip [arp|dhcp]

no ip arp [header-mismatch-validation|trust]

no ip dhcp trust

no dpi metadata [http|ssl|voice-video]

no ipv6 [dhcppv6|nd]

no ipv6 dhcppv6 trust

no ipv6 nd [header-mismatch-validation|raguard|trust]

no kerberos [password|realm|server]

no kerberos server [primary host|secondary host|timeout]

no mac-authentication [cached-credentials|enforce-always]

no nsight client-history

no radio-resource-measurement {channel-report|neighbor-report {hybrid}}

no radius [dynamic-authorization|nas-identifier|nas-port-id|vlan-assignment]

no registration {external}

no relay-agent [dhcpp-option82|dhcppv6-ldra]
no shutdown {on-critical-resource|on-meshpoint-loss|on-legacy-primary-port-link-loss|on-legacy-unadoption}

no time-based-access days [all|friday|monday|saturday|sunday|thursday|tuesday|wednesday|weekdays|weekends]

no use [aaa-policy|association-acl-policy|bonjour-gw-discovery-policy|captive-portal|ip-access-list|ipv6-access-list|mac-access-list|passpoint-policy|roaming-assist-policy|url-filter|wlan-qos-policy]

no vlan-pool-member [<1-40 95>|<VLAN-ALIAS-NAME>]

no [wep128|wep64] [key {1-4}|transmit-key]

no wing-extension [move-command|smart-scan|wing-load-information|wmm-load-information]

no wireless-client [count-per-radio|cred-cache-ageout|hold-time|inactivity-timeout|max-firewall-sessions|reauthentication|roam-notification|t5-inactivity-timeout|tx-power|vlan-cache-ageout]

Parameters

- no <PARAMETERS>

no <PARAMETERS> Removes or reverts this WLAN's settings based on the parameters passed

Usage Guidelines

The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

Examples

rfs7000-37FABE(config-wlan-test)#no 

accounting Configure how accounting records are created for this wlan

acl Actions taken based on ACL configuration [ packet drop being one of them]

answer-broadcast-probes Do not Include this wlan when responding to probe requests that do not specify an SSID

assoc-response Association response threshold

association-list Configure the association list for the wlan

authentication-type Reset the authentication to use on this wlan to default (none/Pre-shared keys)

broadcast-dhcp Configure broadcast DHCP packet handling

broadcast-ssid Do not advertise the SSID of the WLAN in beacons

captive-portal-enforcement Configure how captive-portal is enforced on the wlan

client-access Disallow client access on this wlan (no data operations)

client-client-communication Disallow switching of frames from one wireless client to another on this wlan

client-load-balancing Disable load-balancing of clients on this wlan

controller-assisted-mobility Disable configure assisted mobility

data-rates Reset data rate configuration to default

description Reset the description of the wlan

downstream-group-addressed-forwarding Disable downstream group addressed forwarding of packets

dpi Deep-Packet-Inspection (Application Assurance)
dynamic-vlan-assignment

eap-types

encryption-type

enforce-dhcp

fast-bss-transition

http-analyze

ip

ipv6

t5-client-isolation

t5-security

time-based-access

use

wlan

wlan-pool-member

wepl28

wepl64

wing-extensions

wireless-client

wpa-wpa2

service

Dynamic VLAN assignment configuration
Allow all EAP types on this wlan
Reset the encryption to use on this wlan to default (none)
Drop packets from Wireless Clients with static IP address
Disable support for 802.11r Fast BSS Transition
Enable HTTP URL analysis on the wlan
Internet Protocol (IP)
Internet Protocol version 6 (IPv6)
Configure kerberos authentication parameters
Configure mac-authentication related parameters
Nsight Server
OpenDNS related config for this wlan
Disable support for Protected Management Frames (IEEE 802.11w)
Configure handling of ARP requests with proxy-arp is enabled
Configure handling of IPv6 ND requests with proxy-nd is enabled
Disable the 802.11u QoS map element and frame
Disable support for 802.11k Radio Resource Measurement
Configure RADIUS related parameters
Dynamic registration of device (or) user
Configure dhcp relay agent info
Enable the use of this wlan
Configure ssid
Do not Isolate traffic among clients
Configure encryption and authentication
Reset time-based-access parameters to default
Set setting to use
Map the default vlan (vlan-id 1) to the wlan
Delete a mapped vlan from this wlan
Reset WEP128 parameters
Reset WEP64 parameters
Disable support for WiNG-Specific extensions to 802.11
Configure wireless-client specific parameters
Modify tkip-ccmp (wpa/wpa2) related parameters
Service to monitor to show no-service page to user

rfs7000-37FABE(config-wlan-test)#

The test settings before execution of the no command:
rfs7000-37FABE(config-wlan-test)#show context wlan test
description TestWLAN
ssid test
bridging-mode local
eccryption-type tkip-ccmp
authentication-type eap
kerberos server timeout 12
kerberos server primary host 172.16.10.2
accounting syslog host 172.16.10.4 port 2
data-rates 2.4GHz gn
wing-extensions wmm-load-information
client-load-balancing probe-req-intvl 5ghz 5
client-load-balancing band-discovery-intvl 2
**captive-portal-enforcement fall-back**
ip dhcp trust
acl exceed-rate wireless-client-denied-traffic 20 disassociate
**enforce-dhcp**
broadcast-dhcp validate-offer
http-analyze controller
rfs7000-37FAE(config-wlan-test)#

rfs7000-37FAE(config-wlan-test)#no accounting syslog
rfs7000-37FAE(config-wlan-test)#no description
rfs7000-37FAE(config-wlan-test)#no authentication-type
rfs7000-37FAE(config-wlan-test)#no encryption-type
rfs7000-37FAE(config-wlan-test)#no enforce-dhcp
rfs7000-37FAE(config-wlan-test)#no kerberos server primary host
rfs7000-37FAE(config-wlan-test)#no kerberos server timeout
rfs7000-37FAE(config-wlan-test)#no data-rates 2.4GHz
rfs7000-37FAE(config-wlan-test)#no ip dhcp trust
rfs7000-37FAE(config-wlan-test)#no captive-portal-enforcement

The test settings after the execution of the no command:
rfs7000-37FAE(config-wlan-test)#show context wlan test
  ssid test
  bridging-mode local
  encryption-type none
  authentication-type none
  wing-extensions wmm-load-information
  client-load-balancing probe-req-intvl 5ghz 5
  client-load-balancing band-discovery-intvl 2
  acl exceed-rate wireless-client-denied-traffic 20 disassociate
  broadcast-dhcp validate-offer
  http-analyze controller
rfs7000-37FAE(config-wlan-test)#
4.1.97.2.30 nsight

wlan-mode commands

Enables retention of client-history

A typical NSight-server enabled, guest access environment may be visited by thousands of unique clients on a daily basis. Some of these guest clients are not regular visitors, accessing the network infrequently. However, by default, historical data of all guest clients, irrespective of their network access frequency, is retained by the NSight server for up to 180 days. This results in the database containing thousands if not millions of unique MAC addresses of infrequent guest clients. To address this potential problem it is recommended to disable client-history retention on a guest WLAN, and use the nsight-policy context to configure a separate timer (8 hours by default) specifying the guest client data lifespan in the MongoDB database.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

nsight client-history

Parameters

- nsight client-history

| nsight client-history | Enables retention of client-history in the MongoDB database. This option is enabled by default. |

Examples

On a WLAN, the client-history option is enabled by default. When enabled, all client history (including guest-clients) is retained in the NSight server database for 180 days.

To disable this option, execute the no > nsight > client-history command. When disabled, guest client history is retained only for 8 hours, which is the default setting defined by the NSight policy applied on the access point (through which the guest client accesses the WLAN) or the access point’s RF Domain. However, the default historical data retention duration for regular clients and devices (access point and controllers) remains unchanged (180 days) as per the NSight policy settings.

```
nx9500-6C8809(config-wlan-test3)#no nsight client-history
nx9500-6C8809(config-wlan-test3)#show context
wlan test3
  ssid test3
  bridging-mode local
  encryption-type none
  authentication-type none
  no nsight client-history
nx9500-6C8809(config-wlan-test3)#
```

Use the NSight policy context to define separate client-history retention time for regular clients, devices, and guest clients. For more information, see nsight-policy.

Related Commands

| no | Disables client-history retention in the NSight MongoDB database |
Enables integration of access points, wireless controllers, and service platforms with OpenDNS. When configured, DNS queries from wireless clients are redirected to OpenDNS (208.67.220.220 OR 208.67.222.222). These OpenDNS resolvers act as proxy DNS servers that provide additional functionalities, such as Web filtering, reporting, and performance enhancement.

This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`opendns device-id <DEVICE-ID>`

**Parameters**

- `opendns device-id <DEVICE-ID>`

<table>
<thead>
<tr>
<th><code>opendns device-id &lt;DEVICE-ID&gt;</code></th>
<th>Configures the device ID sent to OpenDNS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-ID&gt;</code> – Specify the device ID. The device-id entered here is obtained from the OpenDNS site by executing the following command in the Privi Exec Mode: <code>opendns &gt; username &lt;WORD&gt; password &lt;WORD&gt; label &lt;WORD&gt;</code>. For more information, see <code>opendns</code>.</td>
</tr>
<tr>
<td></td>
<td>Once configured on a WLAN, this value is embedded in each DNS query packet going out from an access point, wireless controller, or service platform to the OpenDNS server. The device ID is a sixteen (16) character hex string representing a 64 bit unsigned integer. Use the <code>no &gt; opendns &gt; device-id</code> command to remove the configured device-id.</td>
</tr>
<tr>
<td></td>
<td>Therefore, when a wireless client associates with a OpenDNS enabled WLAN, all DNS queries originating from the client are appended with an additional 31 bytes of data (representing the device ID) at the end of the DNS packet.</td>
</tr>
<tr>
<td>Note:</td>
<td>To enable redirection of DNS query to OpenDNS it is necessary that the DNS server's IP address provided in the DHCP Server policy (used by the client) should point to the OpenDNS IP address (208.67.220.220 OR 208.67.222.222). For more information, see <code>dns-server</code>.</td>
</tr>
<tr>
<td>For example:</td>
<td><code>rfs7000-37FABE(config-dhcp-policy-dhcppolicy-pool-dhcppool)#show context</code></td>
</tr>
<tr>
<td></td>
<td><code>dhcppool dhcppool</code></td>
</tr>
<tr>
<td></td>
<td><code>network 192.168.13.0/24</code></td>
</tr>
<tr>
<td></td>
<td><code>address range 192.168.13.160 192.168.13.200</code></td>
</tr>
<tr>
<td></td>
<td><code>default-router 192.168.13.105</code></td>
</tr>
<tr>
<td></td>
<td><code>dns-server 208.67.220.220 208.67.222.222</code></td>
</tr>
<tr>
<td></td>
<td><code>rfs7000-37FABE(config-dhcp-policy-dhcppolicy-pool-dhcppool)#</code></td>
</tr>
<tr>
<td>Contd...</td>
<td></td>
</tr>
</tbody>
</table>
Examples
Following examples show all configurations required to integrate access points and controllers with the OpenDNS service:

Step 1. In the Privilege Executable Mode:

```
ap7131-E6D512#opendns username bob@examplecompany.com password opendns label company_name
Connecting to OpenDNS server...
device_id = 0014AADF8EDC6C59
```
ap7131-E6D512#

Step 2: To enable OpenDNS on a WLAN, apply the device-id, obtained in the preceding step, to the WLAN:

```
ap7131-E6D512(config)#wlan opendns
ap7131-E6D512(config-wlan-opendns)#opendns device-id 0014AADF8EDC6C59
ap7131-E6D512(config-wlan-opendns)#commit
```
ap7131-E6D512(config-wlan-opendns)#

The following examples show the other mandatory configurations needed to redirect wireless client DNS queries to the OpenDNS server:

```
ap7131-E6D512(config)#self
ap7131-E6D512(config-device-00-15-70-E6-D5-12)#
```

Step 3: To enable DNS resolution on the access point or controller, execute the following commands:

```
ap7131-E6D512(config-device-00-15-70-E6-D5-12)#ip name-server 144.189.100.51
ap7131-E6D512(config-device-00-15-70-E6-D5-12)#ip dns-server-forward
```
ap7131-E6D512(config-device-00-15-70-E6-D5-12)#

Note: To prevent wireless clients from bypassing the OpenDNS resolver by adding their own DNS servers, configure and apply an IP ACL on the access point, wireless controller, or service platform containing the following firewall rules:

```
rf7000-37FABE(config-ip-acl-dns-list)#show context
ip access-list dns-list
   permit udp any host 208.67.222.222 eq dns rule-precedence 1 rule-description "allow dns queries only to OpenDNS"
   deny udp any any eq dns rule-precedence 10 rule-description "block all other dns queries"
   permit ip any any rule-precedence 100 rule-description "allow all other ip packets"
rf7000-37FABE(config-ip-acl-dns-list)#
```

Note:
wlan opendns bss 1 primary
interface ge1
  switchport mode access
  switchport access vlan 10
interface vlan1
  ip address 192.168.1.105/24
  ip dhcp client request options all
  ip nat inside
  no ipv6 enable
  no ipv6 request-dhcpv6-options
interface vlan10
  ip address 144.190.204.218/24
  no ipv6 enable
  no ipv6 request-dhcipv6-options
  use dhcp-server-policy dhcppolicy

ip dns-server-forward
  logging on
  logging console debugging
  logging buffered warnings
  ip nat inside source list my_list precedence 10 interface vlan10 overload
  enforce-version adoption none

ap7131-E6D512(config-device-00-15-70-E6-D5-12)#

Step 4: To ensure that the OpenDNS-enabled WLAN's client's DNS queries are redirected to the OpenDNS server, execute the following commands:

ap7131-E6D512(config)#dhcp-server-policy dhcppolicy
ap7131-E6D512(config-dhcp-policy-dhcppolicy)#dhcp-pool opendns
ap7131-E6D512(config-dhcp-policy-dhcppolicy)#show context
dhcp-server-policy dhcppolicy
  dhcp-pool dhcppool
    network 192.168.1.0/24
    address range 192.168.1.160 192.168.1.200
    default-router 192.168.1.105
dns-server 208.67.222.222
ap7131-E6D512(config-dhcp-policy-dhcppolicy)#

ap7131-E6D512(config)#self
ap7131-E6D512(config-device-00-15-70-E6-D5-12)#use dhcp-server-policy dhcppolicy

Related Commands

| no | Removes the device ID configured to be forwarded to the DNS query |
4.1.97.2.32 protected-mgmt-frames

wlan-mode commands

Configures the WLAN's frame protection mode and security association (SA) query parameters.

802.11w provides protection for both unicast management frames and broadcast/multicast management frames. The 'robust management frames' are action, disassociation, and deauthentication frames. The standard provides one security protocol CCMP for protection of unicast robust management frames. Protected management frames (PMF) protocol only applies to robust management frames after establishment of RSNA PTK. Robust management frame protection is achieved by using CCMP for unicast management frames, broadcast/multicast integrity protocol (BIP) for broadcast/multicast management frames and SA query protocol for protection against (re)association attacks.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

protected-mgmt-frames [mandatory|optional|sa-query [attempts <1-10>|timeout <100-1000>]]

Parameters
- protected-mgmt-frames [mandatory|optional|sa-query [attempts <1-10>|timeout <100-1000>]]

<table>
<thead>
<tr>
<th>protected-mgmt-frames</th>
<th>Enables and configures WLAN's frame protection mode and SA query parameters. Use this command to specify whether management frames are continually or optionally protected. Frame protection mode is disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>mandatory</td>
<td>Enforces protected management frames (PMF) on this WLAN (management frames are continually optionally protected)</td>
</tr>
<tr>
<td>optional</td>
<td>Provides PMF only for those clients that support PMF (management frames are optionally protected)</td>
</tr>
<tr>
<td>sa-query [attempts &lt;1-10&gt;</td>
<td>timeout &lt;100-1000&gt;]]</td>
</tr>
<tr>
<td></td>
<td>• attempts &lt;1-10&gt; – Configures the number of SA query attempts from 1 - 10. The default is 5.</td>
</tr>
<tr>
<td></td>
<td>• timeout &lt;100-1000&gt; – Configures the interval, in milliseconds, used to timeout association requests that exceed the defined interval. Specify a value from 100 - 1000 milliseconds. The default value is 201 milliseconds.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-wlan-test)#protected-mgmt-frames mandatory

rfs7000-37FABE(config-wlan-test)#show context
wlan test
ssid test
bridging-mode tunnel
encryption-type none
authentication-type none
protected-mgmt-frames mandatory
rfs7000-37FABE(config-wlan-test)#
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables enforcement of protected management frames on this WLAN. And reverts protected management frames sa-query timeout and attempts to 201 milliseconds and 5 respectively.</td>
</tr>
</tbody>
</table>
4.1.97.2.33 proxy-arp-mode

Enables proxy ARP mode for handling ARP requests.

Proxy ARP is the technique used to answer ARP requests intended for another system. By faking its identity, the access point accepts responsibility for routing packets to the actual destination.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
proxy-arp-mode [dynamic|strict]

Parameters
- proxy-arp-mode [dynamic|strict]

<table>
<thead>
<tr>
<th>proxy-arp-mode</th>
<th>Enables proxy ARP mode for handling ARP requests. The options available are dynamic and strict.</th>
</tr>
</thead>
<tbody>
<tr>
<td>dynamic</td>
<td>Forwards ARP requests to the wireless side (for which a response could not be proxied). This is the default setting.</td>
</tr>
<tr>
<td>strict</td>
<td>Does not forward ARP requests to the wireless side</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-wlan-test)#proxy-arp-mode strict
rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode local
  encryption-type none
  authentication-type none
  protected-mgmt-frames mandatory
  wing-extensions wmm-load-information
  client-load-balancing probe-req-intvl 5ghz 5
  client-load-balancing band-discovery-intvl 2
  acl exceed-rate wireless-client-denied-traffic 20 disassociate
rfs7000-37FABE(config-wlan-test)#proxy-arp-mode strict
rfs7000-37FABE(config-wlan-test)#broadcast-dhcp validate-offer
rfs7000-37FABE(config-wlan-test)#http-analyze controller

Related Commands
- **no** Reverts the proxy ARP mode to default (dynamic)
4.1.97.2.34  proxy-nd-mode

   wlan-mode commands

Configures the proxy ND mode for this WLAN member clients as either strict or dynamic
ND proxy is used in IPv6 to provide reachability by allowing a client to act as proxy. Proxy certificate signing can
be done either dynamically (requiring exchanges of identity and authorization information) or statically when the
network topology is defined.

Supported in the following platforms:
   • Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX,
     AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
   • Wireless Controllers — RFS4000, RFS6000, RFS7000
   • Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530,
     NX9000, NX9500, NX9510, NX9600

Syntax
proxy-nd-mode [dynamic|strict]

Parameters
• proxy-nd-mode [dynamic|strict]

+------------------|-------------------------------------------------------------------------------------------------
| proxy-nd-mode     | Configures the proxy ND mode for this WLAN member clients. The options are: dynamic and strict    |
| [dynamic|strict]    | • dynamic – Forwards ND request to wireless for which a response could not be proxied. This is the default value. |
|                   | • strict – Does not forward ND requests to the wireless side                                   |

Examples
rfs7000-37FABE(config-wlan-test)#proxy-nd-mode strict
rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode tunnel
  encryption-type none
  authentication-type none
  wpa-wpa2 server-only-authentication
  proxy-nd-mode strict
  opendns device-id 44-55-66
  rfs7000-37FABE(config-wlan-test)#

Related Commands
  no  Reverts the proxy ND mode to default (dynamic)
4.1.97.2.35 qos-map

wlan-mode commands

Enables support for 802.11u QoS map element and frames

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

qos-map

Parameters

None

Examples

rfs7000-37FABE(config-wlan-test)#qos-map
rfs7000-37FABE(config-wlan-test)#show context
wlan test
ssid test
bridging-mode tunnel
encryption-type none
authentication-type none
  qos-map
  wpa-wpa2 server-only-authentication
  proxy-nd-mode strict
  opendns device-id 44-55-66
rfs7000-37FABE(config-wlan-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables support for 802.11u QoS map element and frames</td>
</tr>
</tbody>
</table>
4.1.97.2.36 radio-resource-measurement

- **wlan-mode commands**

   Enables support for 802.11k radio resource measurement capabilities (IEEE 802.11k) on this WLAN. 802.11k improves how traffic is distributed. In a WLAN, devices normally connect to the access point with the strongest signal. Depending on the number and location of clients, this arrangement can lead to excessive demand on one access point and underutilization of others, resulting in degradation of overall network performance. With 802.11k, if the access point with the strongest signal is loaded to its capacity, a client connects to an under-utilized access point. Even if the signal is weaker, the overall throughput is greater since it's an efficient use of the network's resources. This feature is disabled by default.

   Supported in the following platforms:
   - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
   - Wireless Controllers — RFS4000, RFS6000, RFS7000
   - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
radio-resource-measurement {channel-report|neighbor-report {hybrid}}
```

**Parameters**

- **radio-resource-measurement**
  - {channel-report|neighbor-report {hybrid}}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>radio-resource-measurement</td>
<td>Enables support for 802.11k radio resource measurement capabilities</td>
</tr>
<tr>
<td>channel-report</td>
<td>Optional. Includes the channel-report element in beacons and probe responses</td>
</tr>
<tr>
<td>neighbor-report {hybrid}</td>
<td>Optional. Enables responding to neighbor-report requests</td>
</tr>
<tr>
<td>hybrid</td>
<td>Optional. Uses the hybrid model of smart-rf neighbors and roaming frequency to neighbors</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs4000-229D58(config-wlan-test)#radio-resource-measurement
rfs4000-229D58(config-wlan-test)#show context
wlan test
ssid test
vlan 1
bridging-mode tunnel
encryption-type none
authentication-type none
radio-resource-measurement
controller-assisted-mobility
rfs4000-229D58(config-wlan-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables support for 802.11k radio resource measurement capabilities (IEEE 802.11k) on this WLAN</td>
</tr>
</tbody>
</table>


4.1.97.2.37 radius

\* wlan-mode commands

Configures RADIUS related parameters

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

radius [dynamic-authorization|nas-identifier|nas-port-id|vlan-assignment]

radius [dynamic-authorization|nas-identifier <NAS-ID>|nas-port-id <NAS-PORT-ID>|vlan-assignment]

Parameters
- radius [dynamic-authorization|nas-identifier <NAS-ID>|nas-port-id <NAS-PORT-ID>|vlan-assignment]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dynamic-authorization</td>
<td>Enables support for disconnect and change of authorization messages (RFC5176) When enabled, this option extends the RADIUS protocol to support unsolicited messages from the RADIUS server. These messages allow administrators to issue change of authorization (CoA) messages, which affect session authorization, or disconnect messages (DM) that terminate a session immediately. This option is disabled by default.</td>
</tr>
</tbody>
</table>
| nas-identifier <NAS-ID> | Configures the network access server (NAS) identifier attribute, a value that identifies the access point or controller where the RADIUS messages originate. The value specified here is included in the RADIUS NAS-Identifier field for WLAN authentication and accounting packets.  
  • <NAS-ID> – Specify the NAS identifier attribute (should not exceed 256 characters in length). |
| nas-port-id <NAS-PORT-ID> | Configures the NAS port ID attribute, a value that identifies the port from where the RADIUS messages originate  
  • <NAS-PORT-ID> – Specify the NAS port ID attribute (should not exceed 256 characters in length).  
  The profile database on the RADIUS server consists of user profiles for each connected NAS port. Each profile is matched to a username representing a physical port. When authorizing users, it queries the user profile database using a username representative of the physical NAS port making the connection. Set the numeric port value from 0 - 4294967295. |
| vlan-assignment | Configures the VLAN assignment of a WLAN. RADIUS VLAN assignment is disabled by default.  
  When enabled, this option assigns clients to the RADIUS server specified VLANs, overriding the WLAN configuration. This option is disabled by default. If, as part of the authentication process, the RADIUS server returns a client's VLAN-ID in a RADIUS access-accept packet, and this feature is enabled, all client traffic is forwarded on that VLAN. If disabled, the RADIUS server returned VLAN-ID is ignored and the VLAN specified using the vlan/vlan-pool-member options (in the WLAN config mode) is used.  
  Note: If both the RADIUS VLAN assignment and the post authentication VLAN options are enabled, then RADIUS VLAN assignment takes priority over post authentication VLAN configuration. |
Examples

rfs7000-37FABE(config-wlan-test)#radius vlan-assignment

rfs7000-37FABE(config-wlan-test)#show context
wlan test
ssid test
bridging-mode local
encryption-type none
authentication-type none
protected-mgmt-frames mandatory
radius vlan-assignment
wing-extensions wmm-load-information
client-load-balancing probe-req-intvl 5ghz 5
client-load-balancing band-discovery-intvl 2
--More--
rfs7000-37FABE(config-wlan-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables support for disconnect and change of authorization messages. Disables the use of VLAN information received in RADIUS server responses, instead uses the VLAN provided in the WLAN configuration. Removes the NAS identifier and NAS port identifiers configured.</td>
</tr>
</tbody>
</table>
4.1.97.2.38 **registration**

**wlan-mode commands**

Configures settings enabling dynamic validation of devices by MAC address to continue the authentication process. When enabled, this option registers a device’s MAC address, and allows direct access to a previously registered device.

Supported in the following platforms:

- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

registration [device|device-OTP|external|user]

registration [device|device-OTP|user] group-name <RAD-GROUP-NAME> {agreement-refresh <0-144000>|expiry-time <1-43800>}

registration external host <IP/HOSTNAME> {proxy-mode [none|through-controller|through-rf-domain-manager]}

**Parameters**

- registration external host <IP/HOSTNAME> {proxy-mode [none|through-controller|through-rf-domain-manager]}

<table>
<thead>
<tr>
<th>registration</th>
<th>Enables dynamic user registration. This option is disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>external</td>
<td>Forwards user information to an external device (i.e. WLAN authentication is handled by an external controller or access point). Use this option to specify the external controller or access point’s details. This option is disabled by default.</td>
</tr>
<tr>
<td>host</td>
<td>Specifies the external controller or access point’s IP address or hostname</td>
</tr>
<tr>
<td>proxy-mode</td>
<td>Optional. Specifies the proxy mode. If a proxy is needed for connection, specify the proxy mode as through-controller, through-rf-domain. If no proxy is needed, select none.</td>
</tr>
<tr>
<td></td>
<td>• none – Requests are sent directly to the controller from the requesting device</td>
</tr>
<tr>
<td></td>
<td>• through-controller – Requests are proxied through the controller configuring the device</td>
</tr>
<tr>
<td></td>
<td>• through-rf-domain-manager – Requests are proxied through the local RF Domain manager</td>
</tr>
</tbody>
</table>

- registration [device|device-OTP|user] group-name <RAD-GROUP-NAME> {agreement-refresh <0-144000>|expiry-time <1-43800>}

<table>
<thead>
<tr>
<th>registration</th>
<th>Enables dynamic user registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>[device</td>
<td>device-OTP</td>
</tr>
<tr>
<td></td>
<td>• device-OTP – Use this option for MAC registration of users and provision of a <strong>one-time-passcode</strong> (OTP). If using this option, set the WLAN authentication type as <strong>MAC authentication</strong>. In this scenario, captive-portal guest users authenticate using their User ID (e-mail address, mobile number, or member id) and the received OTP in order to complete registration.</td>
</tr>
<tr>
<td></td>
<td>• device – Use this option when captive portal device registration is through social media. When using this option, ensure that the captive portal is configured for guest user social authentication. For more information, see <strong>oauth</strong>.</td>
</tr>
<tr>
<td></td>
<td>• user – Use this option for guest users using one of the following options as their user ID during registration: e-mail address, mobile-number, or member-id.</td>
</tr>
</tbody>
</table>
### Examples

- **nx9500-6C8809(config-wlan-test)#registration user group-name guest agreement-refresh 14400 expiry-time 2000**
- **nx9500-6C8809(config-wlan-test)#show context wlan test ssid test bridging-mode local encryption-type none authentication-type none registration user group-name guest expiry-time 2000 agreement-refresh 14400**

**Related Commands**

- **no**
  
  Disables dynamic user registration and removes associated configurations. Also disables forwarding of user information to an external device.
4.1.97.2.39 relay-agent

wlan-mode commands

Enables support for DHCP/DHCPv6 relay agent information (option 82 and DHCPv6-LDRA) feature on this WLAN. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
relay-agent [dhcp-option82|dhcpv6-ldra]

Parameters
- relay-agent [dhcp-option82|dhcpv6-ldra]

| relay-agent | Enables support for the following DHCP and DHCPv6 options: option 82 and Lightweight DHCPv6 Relay Agent (LDRA) respectively. When enabled, this feature allows the DHCP/DHCPv6 relay agent to insert the relay agent information option (option 82, LDRA) in client requests forwarded to the DHCP/DHCPv6 server. This information provides the following:
| dhcp-option82 | Enables DHCP option 82. DHCP option 82 provides client physical attachment information. This option is disabled by default.
| dhcpv6-ldra | Enables the DHCPv6 relay agent. The DHCPv6 LDRA allows DHCPv6 messages to be transmitted on existing networks that do not currently support IPv6 or DHCPv6. This option is disabled by default.

Examples
rfs4000-229D58(config-wlan-test)#relay-agent dhcp-option82
rfs4000-229D58(config-wlan-test)#show context
wlan test
 ssid test
 vlan 1
 bridging-mode tunnel
 encryption-type none
 authentication-type none
 radio-resource-measurement
 relay-agent dhcp-option82
 controller-assisted-mobility
 rfs4000-229D58(config-wlan-test)#

rfs6000-81701D(config-wlan-test)#relay-agent dhcpv6-ldra
rfs6000-81701D(config-wlan-test)#show context
wlan test
 ssid test
 bridging-mode tunnel
 encryption-type none
 authentication-type none
 relay-agent dhcpv6-ldra
 rfs6000-81701D(config-wlan-test)#
## Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables support for DHCP/DHCPv6 relay agent information (option 82 and DHCPv6-LDRA) feature on this WLAN</td>
</tr>
</tbody>
</table>
4.1.97.2.40 shutdown

Auto shuts down a WLAN

The auto shutdown mechanism helps regulate the availability of a WLAN based on an administrator defined access period. Use this feature to shut down a WLAN on specific days and hours and restrict periods when the WLAN traffic is either not desired or cannot be properly administered. The normal practice is to shut down WLANs when there are no users on the network, such as after hours, weekends or holidays. This allows administrators more time to manage mission critical tasks since the WLAN's availability is automated.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
shutdown {on-critical-resource <CR-NAME>|on-meshpoint-loss|on-primary-port-link-loss|on-unadoption}
```

Parameters

- `shutdown {on-critical-resource <CR-NAME>|on-meshpoint-loss|on-primary-port-link-loss|on-unadoption}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>shutdown</code></td>
<td>Auto shuts down the WLAN when specified events occur. Disabled by default.</td>
</tr>
</tbody>
</table>
  - `<CR-NAME>` – Specifies the name of the critical resource being monitored for this WLAN.                                        |
| on-meshpoint-loss          | Optional. Auto shuts down the WLAN when the root meshpoint link fails (is unreachable). Disabled by default.                           |
| on-primary-port-link-loss  | Optional. Auto shuts down the WLAN when a device losses its primary Ethernet port (ge1/up1) link. Disabled by default.                  |
| on-unadoption              | Optional. Auto shuts down the WLAN when an adopted device becomes unadopted. Disabled by default.                                    |

Usage Guidelines

If the shutdown on-meshpoint-loss feature is enabled, the WLAN status changes only if the meshpoint and the WLAN are mapped to the same VLAN. If the meshpoint is mapped to VLAN 1 and the WLAN is mapped to VLAN 2, then the WLAN status does not change on loss of the meshpoint.

Examples

```
rfs7000-37FABE(config-wlan-test)#shutdown on-unadoption
rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode local
  encryption-type none
  authentication-type none
  protected-mgmt-frames mandatory
  radius vlan-assignment
  wing-extensions wmm-load-information
  client-load-balancing probe-req-intvl 5ghz 5
  client-load-balancing band-discovery-intvl 2
```
acl exceed-rate wireless-client-denied-traffic 20 disassociate
proxy-arp-mode strict
broadcast-dhcp validate-offer
shutdown on-unadoption
http-analyze controller
rfs7000-37FABE(config-wlan-test)#

## Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables auto shut down WLAN. Use the optional keywords provided to disable auto shut down of the WLAN upon critical resource failure, when meshpoint links fail, when the primary Ethernet port (e1/up1) loses link, or when the WLAN gets unadopted.</td>
</tr>
</tbody>
</table>
4.1.97.2.41 ssid

wlan-mode commands

Configures a WLAN's SSID

Supported in the following platforms:
  • Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  • Wireless Controllers — RFS4000, RFS6000, RFS7000
  • Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
ssid <SSID>
```

Parameters

- `ssid <SSID>`

Examples

```
rfs7000-37FABE(config-wlan-test)#ssid testWLAN1
rfs7000-37FABE(config-wlan-test)#show context
wlan test
   ssid testWLAN1
   bridging-mode local
   encryption-type none
   authentication-type none
   protected-mgmt-frames mandatory
   radius vlan-assignment
   wing-extensions wmm-load-information
   client-load-balancing probe-req-intvl 5ghz 5
   client-load-balancing band-discovery-intvl 2
   acl exceed-rate wireless-client-denied-traffic 20 disassociate
   proxy-arp-mode strict
   broadcast-dhcp validate-offer
   shutdown on-unadoption
   http-analyze controller
   rfs7000-37FABE(config-wlan-test)#
```

Related Commands

```
no
```

Removes the WLAN's SSID
4.197.2.42 t5-client-isolation

Disallows clients connecting to the WLAN to communicate with one another. This setting applies exclusively to CPE devices managed by a T5 controller and is disabled by default.

A T5 controller uses the IPX operating system to manage its connected radio devices, as opposed to the WiNG operating system used by RFS wireless controllers and NX service platforms. However, a T5 controller, once enabled as a supported external device, can provide data to WiNG to assist in a T5's management within a WiNG supported subnet populated by both types of devices. The CPEs are the T5 controller managed radio devices using the IPX operating system. These CPEs use a DSL as their high speed Internet access mechanism using the CPE’s physical wallplate connection and phone jack.

Supported in the following platforms:

- Wireless Controllers — RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

t5-client-isolation

Parameters

None

Examples

nx9500-6C8809(config-wlan-test)#t5-client-isolation

nx9500-6C8809(config-wlan-test)#show context wlan test

ssid test

encryption-type none

authentication-type none

t5-client-isolation

nx9500-6C8809(config-wlan-test)#

Related Commands

no | Allows clients connecting to the WLAN to communicate with one another

NOTE: This setting is applicable only when this WLAN supports T5 controllers and their connected CPEs.
4.1.97.2.43  t5-security

`wlan-mode commands`

Configures T5 PowerBroadband security settings

A T5 controller uses the IPX operating system to manage its connected radio devices, as opposed to the WiNG operating system used by RFS controllers and NX service platforms. However, a T5 controller, once enabled as a supported external device, can provide data to WiNG to assist in a T5’s management within a WiNG supported subnet populated by both types of devices. The CPEs are the T5 controller managed radio devices using the IPX operating system. These CPEs use DSL as their high speed Internet access mechanism using the CPE’s physical wallplate connection and phone jack.

---

**NOTE:** This setting is applicable only when this WLAN supports T5 controllers and their connected CPEs.

Supported in the following platforms:

- Wireless Controllers — RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
t5-security [static-wep|wpa-enterprise|wpa-personal]
```

```
t5-security static-wep encryption-type [wep128|wep64] [hex <STRING>|passphrase <STRING>]
```

```
t5-security [wpa-enterprise|wpa-personal] encryption-type [ccmp|tkip|tkip-ccmp] version [mixed|wpa|wpa2]
```

**Parameters**

- `t5-security static-wep encryption-type [wep128|wep64] [hex <STRING>|passphrase <STRING>]`

- `t5-security [wpa-enterprise|wpa-personal] encryption-type [ccmp|tkip|tkip-ccmp] version [mixed|wpa|wpa2]`

<table>
<thead>
<tr>
<th>t5-security static-wep</th>
<th>Configures the T5 WLAN security type as static-wep</th>
</tr>
</thead>
<tbody>
<tr>
<td>encryption-type [wep128</td>
<td>wep64]</td>
</tr>
<tr>
<td>hex &lt;STRING&gt;</td>
<td>Configures the hex password (used to derive the security key)</td>
</tr>
<tr>
<td>passphrase &lt;STRING&gt;</td>
<td>Configures the passphrase shared by both transmitting and receiving authenticators</td>
</tr>
</tbody>
</table>

**NOTE:** This setting is applicable only when this WLAN supports T5 controllers and their connected CPEs.

`t5-security [wpa-enterprise|wpa-personal] encryption-type [ccmp|tkip|tkip-ccmp] version [mixed|wpa|wpa2]`

| t5-security [wpa-enterprise|wpa-personal] | Configures the T5 WLAN security type as: wpa-enterprise OR wpa-personal |
### Examples

```
nx9500-6C8809(config-wlan-test)#t5-security wpa-enterprise encryption-type ccmp
version wpa

nx9500-6C8809(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode local
  encryption-type none
  authentication-type none
  t5-security wpa-enterprise encryption-type ccmp version wpa
  t5-client-isolation
nx9500-6C8809(config-wlan-test)#
```
4.1.97.2.44 time-based-access

Configure time-based access to the network resources.

Administrators can use this feature to assign fixed days and time of WLAN access for wireless clients.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
```
time-based-access days [sunday|monday|tuesday|wednesday|thursday|friday|saturday|all|weekends|weekdays] {start <START-TIME>} [end <END-TIME>]
```

Parameters
- `day <option>` Specifies the day or days on which the client can access the WLAN
  - sunday – Allows access on Sundays only
  - monday – Allows access on Mondays only
  - tuesday – Allows access on Tuesdays only
  - wednesday – Allows access on Wednesdays only
  - thursday – Allows access on Thursdays only
  - friday – Allows access on Fridays only
  - saturday – Allows access on Saturdays only
  - weekends – Allows access on weekends only
  - weekdays – Allows access on weekdays only
  - all – Allows access on all days
- `start <START-TIME>` Optional. Specifies the access start time in hours and minutes (HH:MM)
- `end <END-TIME>` Specifies the access end time in hours and minutes (HH:MM)

Usage Guidelines
Ensure the system clock is configured correctly.

Examples
```
rfs7000-37FABE(config-wlan-test)#time-based-access days weekdays start 10:00 end 16:30
```
```
rfs7000-37FABE(config-wlan-test)#show context
wlan test
 ssid testWLAN1
 bridging-mode local
 encryption-type none
 authentication-type none
 protected-mgmt-frames mandatory
 radius vlan-assignment
time-based-access days weekdays start 10:00 end 16:30
--More--
rfs7000-37FABE(config-wlan-test)#
```

Related Commands
- `no` Removes the configured time-based-access settings
4.1.97.2.45 use

**wlan-mode commands**

This command associates an existing captive portal with a WLAN.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
use [aaa-policy|application-policy|association-acl-policy|bonjour-gw-discovery-policy|
captive-portal|ip-access-list|ipv6-access-list|mac-access-list|passpoint-policy|
roaming-assist-policy|url-filter|wlan-qos-policy]
```

```
use [aaa-policy <AAA-POLICY-NAME>|application-policy <POLICY-NAME>|association-acl-policy |
bonjour-gw-discovery-policy <POLICY-NAME>|captive-portal <CAPTIVE-PORTAL-NAME>|passpoint-policy |
```

```
use ip-access-list [in|out] <IP-ACCESS-LIST-NAME>
```

```
use ipv6-access-list [in|out] <IPv6-ACCESS-LIST-NAME>
```

```
use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME>
```

**Parameters**

- **aaa-policy <AAA-POLICY-NAME>**
  - Uses an existing AAA policy with a WLAN
  - **<AAA-POLICY-NAME>** – Specify the AAA policy name.

- **application-policy <POLICY-NAME>**
  - Uses an existing application policy with a WLAN. An application policy defines actions to perform on a packet when it matches a specified set of pre-defined applications or application categories. For more information, see `application-policy`.
  - **<POLICY-NAME>** – Specify the policy name.

- **association-acl <ASSOCIATION-POLICY-NAME>**
  - Uses an existing association ACL policy with a WLAN
  - **<ASSOCIATION-POLICY-NAME>** – Specify the association ACL policy name.

- **bonjour-gw-discovery-policy <POLICY-NAME>**
  - Uses an existing Bonjour GW Discovery policy with a WLAN. When associated, the Bonjour GW Discovery policy defines a list of services clients can discover across subnets.
  - Bonjour enables discovery of services on a LAN. Bonjour allows the setting up a network (without any configuration) in which services such as printers, scanners and file-sharing servers can be found using Bonjour. Bonjour only works within a single broadcast domain. However, with a special DNS configuration, it can be extended to find services across broadcast domains.
  - **<POLICY-NAME>** – Specify the Bonjour GW Discovery policy name (should be existing and configured).
  - **Note:** For more information on Bonjour GW Discovery policy, see `bonjour-gw-discovery-policy`. 
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal</td>
<td>Enables a WLAN’s captive portal authentication</td>
</tr>
<tr>
<td>&lt;CAPTIVE-PORTAL-NAME&gt;</td>
<td>• &lt;CAPTIVE-PORTAL-NAME&gt; – Specify the captive portal name.</td>
</tr>
<tr>
<td>passpoint-policy</td>
<td>Associates a passpoint policy (Hotspot2 configuration) with this WLAN</td>
</tr>
<tr>
<td>&lt;PASSPOINT-POLICY-NAME&gt;</td>
<td>• &lt;PASSPOINT-POLICY-NAME&gt; – Specify the Hotspot 2.0 policy name.</td>
</tr>
<tr>
<td>Note:</td>
<td>For more information on passpoint policy, see passpoint-policy.</td>
</tr>
<tr>
<td></td>
<td>Map a passpoint policy to a WLAN. Since the configuration gets applied to the radio by BSS, only the Hotspot 2.0 configuration of primary WLANs on a BSSID is used. Incoming Hotspot 2.0 GAQ/ANQP requests from clients are identified by their destination MAC addresses and are handled by the passpoint policy from the primary WLAN on that BSS. Define one passpoint policy for every WLAN configured.</td>
</tr>
<tr>
<td>roaming-assist-policy</td>
<td>Associates an existing roaming assist policy with this WLAN</td>
</tr>
<tr>
<td>&lt;POLICY-NAME&gt;</td>
<td>• &lt;POLICY-NAME&gt; – Specify the Roaming Assist policy name.</td>
</tr>
<tr>
<td>Note:</td>
<td>For more information on roaming assist policy, see roaming-assist-policy.</td>
</tr>
<tr>
<td>url-filter</td>
<td>Associates an existing URL list with this WLAN</td>
</tr>
<tr>
<td>&lt;URL-FILTER-NAME&gt;</td>
<td>• &lt;URL-FILTER-NAME&gt; – Specify the URL filter name.</td>
</tr>
<tr>
<td>Note:</td>
<td>For more information on configuring a URL list, see url-list.</td>
</tr>
<tr>
<td>wlan-qos-policy</td>
<td>Uses an existing WLAN QoS policy with a WLAN</td>
</tr>
<tr>
<td>&lt;WLAN-QOS-POLICY-NAME&gt;</td>
<td>• &lt;wlan-qos-policy-name&gt; – Specify the WLAN QoS policy name.</td>
</tr>
</tbody>
</table>

- use ip-access-list [in|out] <IP-ACCESS-LIST-NAME>

- use ipv6-access-list [in|out] <IPv6-ACCESS-LIST-NAME>

- use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME>

- use ip-access-list [in|out] <IP-ACCESS-LIST-NAME>

- use ipv6-access-list [in|out] <IPv6-ACCESS-LIST-NAME>

- use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME>

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- use ipv6-access-list [in|out] <IPv6-ACCESS-LIST-NAME>

- use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME>

- use ip-access-list [in|out] <IP-ACCESS-LIST-NAME>

- use ipv6-access-list [in|out] <IPv6-ACCESS-LIST-NAME>

- use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME>

- use ip-access-list [in|out] <IP-ACCESS-LIST-NAME>

- use ipv6-access-list [in|out] <IPv6-ACCESS-LIST-NAME>

- use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME>

- use ip-access-list [in|out] <IP-ACCESS-LIST-NAME>

- use ipv6-access-list [in|out] <IPv6-ACCESS-LIST-NAME>

- use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME>

- use ip-access-list [in|out] <IP-ACCESS-LIST-NAME>

- use ipv6-access-list [in|out] <IPv6-ACCESS-LIST-NAME>

- use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME>

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- use ip-access-list [in|out] <IP-ACCESS-LIST-NAME>

- use ipv6-access-list [in|out] <IPv6-ACCESS-LIST-NAME>

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- use ip-access-list [in|out] <IP-ACCESS-LIST-NAME>

- use ipv6-access-list [in|out] <IPv6-ACCESS-LIST-NAME>

- use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME>
Usage Guidelines

IP and MAC ACLs act as firewalls within a WLAN. WLANs use ACLs as firewalls to filter or mark packets based on the WLAN from which they arrive, as opposed to filtering packets on layer 2 ports. An ACL contains an ordered list of Access Control Entries (ACEs). Each ACE specifies a set of conditions (rules) and the action taken in case of a match. The action can be permit, deny, or mark. Therefore, when a packet matches an ACE’s conditions, it is either forwarded, dropped, or marked depending on the action specified in the ACE. The order of conditions in the list is critical since filtering is stopped after the first match.

IP ACLs contain deny and permit rules specifying source and destination IP addresses. Each rule has a precedence order assigned. Both IP and non-IP traffic on the same layer 2 interface can be filtered by applying both an IP ACL and a MAC.

Additionally, you can filter layer 2 traffic on a physical layer 2 interface using MAC addresses. A MAC firewall rule uses source and destination MAC addresses for matching operations, where the result is a typical allow, deny, or mark designation to WLAN packet traffic.

Keep in mind IP and non-IP traffic on the same layer 2 interface can be filtered by applying both an IP ACL and a MAC ACL to the interface.

Examples

```
rfs7000-37FABE(config-wlan-test)#use aaa-policy test
rfs7000-37FABE(config-wlan-test)#use association-acl-policy test
rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid testWLAN1
  bridging-mode local
  encryption-type none
  authentication-type none
  protected-mgmt-frames mandatory
  radius vlan-assignment
  time-based-access days weekdays start 10:00 end 16:30
  wing-extensions wmm-load-information
  client-load-balancing probe-req-intvl 5ghz 5
  client-load-balancing band-discovery-intvl 2
  use aaa-policy test
  use association-acl-policy test
  acl exceed-rate wireless-client-denied-traffic 20 disassociate
  proxy-arp-mode strict
  broadcast-dhcp validate-offer
  shutdown on-unadoption
  http-analyze controller
rfs7000-37FABE(config-wlan-test)#

rfs7000-37FABE(config-wlan-ipad_clients)#use bonjour-gw-discovery-policy generic
rfs7000-37FABE(config-wlan-ipad_clients)#show context
wlan ipad_clients
  ssid ipad_clients
  vlan 41
  bridging-mode local
  encryption-type none
  authentication-type none
  use bonjour-gw-discovery-policy generic
rfs7000-37FABE(config-wlan-ipad_clients)#
```

Related Commands

```
no
```

Removes the following policies associated with a WLAN: aaa-policy, application-policy, association-acl-policy, bonjour-gw-discovery-policy, captive-portal, ip-access-list, ipv6-access-list, mac-access-list, passpoint-policy, roaming-assist-policy, url-filter, or wlan-qos-policy.
4.1.97.2.46  vlan

 Sets the VLAN where traffic from a WLAN is mapped

 Supported in the following platforms:

 - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
 - Wireless Controllers — RFS4000, RFS6000, RFS7000
 - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

 Syntax
 vlan [<1-4094>|<VLAN-ALIAS-NAME>]

 Parameters

 - vlan [<1-4094>|<VLAN-ALIAS-NAME>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-4094&gt;</td>
<td>Sets a WLAN's VLAN ID. This command starts a new VLAN assignment for a WLAN index. All prior VLAN settings are erased. Use this command to assign just one VLAN to the WLAN. Utilizing a single VLAN per WLAN is a more typical deployment scenario than using a VLAN pool.</td>
</tr>
<tr>
<td>&lt;VLAN-ALIAS-NAME&gt;</td>
<td>Assigns a VLAN alias to the WLAN. The VLAN alias should exist and be configured. Note: A VLAN alias maps a name to a VLAN ID. When applied to ports (for example GE ports) using the trunk mode, a VLAN alias denies or permits traffic, on the port, to and from the VLANs specified in the alias. For more information on aliases, see alias.</td>
</tr>
</tbody>
</table>

 Examples
 rfs7000-37FABE(config-wlan-test)#vlan 4
rfs7000-37FABE(config-wlan-test)#show context wlan test
 ssid testWLAN1
 vlan 4
 bridging-mode local
 encryption-type none
 authentication-type none
 protected-mgmt-frames mandatory
 radius vlan-assignment
 time-based-access days weekdays start 10:00 end 16:30
 wing-extensions wmm-load-information
 client-load-balancing probe-req-intvl 5ghz 5
 client-load-balancing band-discovery-intvl 2
 use aaa-policy test
 use association-acl-policy test
 acl exceed-rate wireless-client-denied-traffic 20 disassociate
 proxy-arp-mode strict
 broadcast-dhcp validate-offer
 shutdown on-unadoption
 http-analyze controller
 rfs7000-37FABE(config-wlan-test)#

 Related Commands

 - no: Removes a WLAN’s default VLAN mapping
4.1.97.2.47 vlan-pool-member

 Adds a member VLAN to a WLAN's VLAN pool. Use this option to define the VLANs available to this WLAN. Additionally, define the number of wireless clients supported by each VLAN.

NOTE: Configuration of a VLAN pool overrides the 'vlan' configuration.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

vlan-pool-member <WORD> {limit <0-8192>}

Parameters

- vlan-pool-member <WORD> {limit <0-8192>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vlan-pool-member &lt;WORD&gt;</td>
<td>Adds a member VLAN to a WLAN's VLAN pool</td>
</tr>
<tr>
<td>Note: Since users belonging to separate VLANs can share the same WLAN, it is not necessary to create a new WLAN for every VLAN in the network.</td>
<td></td>
</tr>
<tr>
<td>&lt;WORD&gt;</td>
<td>Define the VLANs available to this WLAN. It is either a single index, or a list of VLAN IDs (for example, 1,3,7), or a range (for example, 1-10)</td>
</tr>
<tr>
<td>limit &lt;0-8192&gt;</td>
<td>Optional. Is ignored if the number of clients are limited and well within the limits of the DHCP pool on the VLAN</td>
</tr>
<tr>
<td></td>
<td>- &lt;0-8192&gt; – Specifies the number of users allowed</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-wlan-test)#vlan-pool-member 1-10 limit 1

rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid testWLAN
  vlan-pool-member 1 limit 1
  vlan-pool-member 2 limit 1
  vlan-pool-member 3 limit 1
  vlan-pool-member 4 limit 1
  vlan-pool-member 5 limit 1
  vlan-pool-member 6 limit 1
  vlan-pool-member 7 limit 1
  vlan-pool-member 8 limit 1
  vlan-pool-member 9 limit 1
  vlan-pool-member 10 limit 1
  bridging-mode local
  encryption-type none
  authentication-type none
  protected-mgmt-frames mandatory
  radius vlan-assignment
  time-based-access days weekdays start 10:00 end 16:30
  wing-extensions wmm-load-information
--More--
rfs7000-37FABE(config-wlan-test)#
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the list of VLANs mapped to a WLAN</td>
</tr>
</tbody>
</table>
4.1.97.2.48  wep128

wlan-mode commands

Configures WEP128 parameters

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

wep128 [key|keys-from-passkey|transmit-key]

wep128 key <1-4> [ascii|hex] [0 <WORD>|2 <WORD>|<WORD>]

wep128 keys-from-passkey <WORD>

wep128 transmit-key <1-4>

Parameters

- **wep128 key <1-4> [ascii|hex] [0 <WORD>|2 <WORD>|<WORD>]**

  sets keys as ASCII characters (5 characters for WEP64, 13 for WEP128)
  - **0 <WORD>** – Configures a clear text key
  - **2 <WORD>** – Configures an encrypted key
  - **<WORD>** – Configures keys as 13 ASCII characters converted to hex, or 26 hexadecimal characters

- **wep128 keys-from-passkey <WORD>**

  Specifies a passphrase from which keys are derived
  - **<WORD>** – Specify a passphrase from 4 - 32 characters.

- **wep128 transmit-key <1-4>**

  Configures the key index used for transmission from an AP to a wireless client or service platform
  - **<1-4>** – Specify a key index from 1 - 4.
Examples

rfs7000-37FABE(config-wlan-test)#wep128 keys-from-passkey example@123

rfs7000-37FABE(config-wlan-test)#show context
wlan test
ssid testWLAN1
vlan-pool-member 1 limit 1
vlan-pool-member 2 limit 1
vlan-pool-member 3 limit 1
vlan-pool-member 4 limit 1
vlan-pool-member 5 limit 1
vlan-pool-member 6 limit 1
vlan-pool-member 7 limit 1
vlan-pool-member 8 limit 1
vlan-pool-member 9 limit 1
vlan-pool-member 10 limit 1
bridging-mode local
encryption-type none
authentication-type none
protected-mgmt-frames mandatory
wep128 key 1 hex 0 25f6e7ed9718918a87a75acc75
wep128 key 2 hex 0 2b3fb36924b22dffe98c86c315
wep128 key 3 hex 0 1ebf3394431700194762ebd5b2
wep128 key 4 hex 0 e3de75be311bd787aeac5e4e8b
radius vlan-assignment
time-based-access days weekdays start 10:00 end 16:30
--More--
rfs7000-37FABE(config-wlan-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets the WEP128 PSK and transmission keys to factory-default values.</td>
</tr>
</tbody>
</table>
4.1.97.2.49  wep64

wlan-mode commands

Configures WEP64 parameters

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

wep64 [key|keys-from-passkey|transmit-key]
wep64 key <1-4> [ascii|hex] [0 <WORD>|2 <WORD>|<WORD>]
wep64 keys-from-passkey <WORD>
wep64 transmit-key <1-4>

Parameters

- **wep64 key <1-4> [ascii|hex] [0 <WORD>|2 <WORD>|<WORD>]**
  - Configures pre-shared hex keys
  - **<1-4>** — Configures a maximum of four key indexes. Select a key index from 1 - 4.
  - **ascii**
    - [0 <WORD>|2 <WORD>|<WORD>]
    - Sets keys as ASCII characters (5 characters for WEP64, 13 for WEP128)
    - **0 <WORD>** — Configures a clear text key
    - **2 <WORD>** — Configures an encrypted key
    - **<WORD>** — Configures the key (10 hex or 5 ASCII characters for WEP64, 26 hex or 13 ASCII characters for WEP128).

- **wep64 keys-from-passkey <WORD>**
  - Specifies a passphrase from which keys are derived
  - **<WORD>** — Specify a passphrase from 4 - 32 characters.

- **wep64 transmit-key <1-4>**
  - Configures the key index used for transmission from an AP to a wireless client or service platform
  - **<1-4>** — Specify a key index from 1 - 4.
### Examples

```bash
rfs7000-37FABE(config-wlan-test)#wep64 key 1 ascii test1

rfs7000-37FABE(config-wlan-test)#wep64 transmit-key 1

rfs7000-37FABE(config-wlan-test)#show context
  wlan test
    ssid testWLAN1
    vlan-pool-member 1 limit 1
    vlan-pool-member 2 limit 1
    vlan-pool-member 3 limit 1
    vlan-pool-member 4 limit 1
    vlan-pool-member 5 limit 1
    vlan-pool-member 6 limit 1
    vlan-pool-member 7 limit 1
    vlan-pool-member 8 limit 1
    vlan-pool-member 9 limit 1
    vlan-pool-member 10 limit 1
    bridging-mode local
    encryption-type none
    authentication-type none
    protected-mgmt-frames mandatory
    wep64 key 1 hex 0 7465737431
    radius vlan-assignment
    time-based-access days weekdays start 10:00 end 16:30
    wing-extensions wmm-load-information
    client-load-balancing probe-req-intvl 5ghz 5
    client-load-balancing band-discovery-intvl 2
    use aaa-policy test
--More--
rfs7000-37FABE(config-wlan-test)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Resets the WEP64 PSK and transmission keys to factory-default values</td>
</tr>
</tbody>
</table>
4.197.2.50 wing-extensions

wlan-mode commands

Enables support for WiNG-specific client extensions to the IEEE 802.11x WLAN standards that potentially increase client roaming reliability and handshake speed

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
wing-extensions [ap-attributes-information {include-hostname}]
coverage-hole-detection {11k-clients|offset <5-20>|threshold <-80--60}]
ft-over-ds-aggregate|move-command|scan-assist {channel-info-interval <6-9>}
smart-scan|wing-load-information|wmm-load-information]
```

Parameters

- wing-extensions [ap-attributes-information {include-hostname}]
- coverage-hole-detection {11k-clients|offset <5-20>|offset <5-20>|threshold <-80--60}]
- ft-over-ds-aggregate|move-command|scan-assist {channel-info-interval <6-9>}
- smart-scan|wing-load-information|wmm-load-information]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wing-extensions</td>
<td>Enables support for inclusion of WiNG-specific client extensions in radio transmissions</td>
</tr>
<tr>
<td>ap-attributes-information {include-hostname}</td>
<td>Enables support for AP attributes information element (IE)</td>
</tr>
<tr>
<td></td>
<td>• include-hostname – Optional. When enabled, includes AP's hostname, as a sub-element, in the AP attributes IE.</td>
</tr>
<tr>
<td></td>
<td>The AP attributes IE is vendor-specific and, when enabled, is added to beacons and probe responses. Inclusion of AP attributes IE allows Zebra terminals to:</td>
</tr>
<tr>
<td></td>
<td>- Recognize Zebra APs</td>
</tr>
<tr>
<td></td>
<td>- Determine if the AP supports PAN BU features, irrespective of whether these features are enabled or not.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> AP attributes IE is not added to beacons and probe responses by default.</td>
</tr>
<tr>
<td>coverage-hole-detection {11k-clients</td>
<td>offset &lt;5-20&gt;threshold &lt;-80--60}&gt;</td>
</tr>
<tr>
<td></td>
<td>After enabling CHD, optionally configure the following parameters:</td>
</tr>
<tr>
<td></td>
<td>• 11k-clients – Optional. Provides coverage hole detection to 802.11k-only-capable clients. This is a reduced set of coverage hole detection capabilities (standard 11k messages and behaviors). This option is disabled by default.</td>
</tr>
<tr>
<td></td>
<td>• offset &lt;5-20&gt; – Optional. Configures the offset added to the threshold to obtain the access point’s signal strength (as seen by the client) considered adequate.</td>
</tr>
<tr>
<td></td>
<td>• &lt;5-20&gt; – Specify the offset value from 5 - 20. The default is 5.</td>
</tr>
<tr>
<td></td>
<td>• threshold – Optional. Configures the access point’s signal strength threshold. When Radio Resource Measurement and CVG Hole are enabled, specify a threshold for the AP’s signal strength (as seen by the client) below which a coverage hole incident is reported by the client.</td>
</tr>
<tr>
<td></td>
<td>• &lt;-80--60&gt; – Specify the threshold from -80 - -60 dBm. The default is -70 dBm.</td>
</tr>
</tbody>
</table>
### ft-over-ds-aggregate
Enables fast-transition (FT) aggregation of action frames. When enabled, increases roaming speed by eliminating separate key exchange handshake frames with potential roam candidates. Enable fast transition to complete an initial FT over distribution system (DS) handshake with multiple roam candidates (up to 6) at once, eliminating the need to send separate FT over DS handshakes to each roam candidate. This option is disabled by default.

### move-command
Enables use of Hyper Fast Secure Roaming (HFSR) for clients on this WLAN. This feature applies only to certain client devices. This option is disabled by default.

### scan-assist
Enables support for scanning assist. When enabled, allows faster roams on Dynamic Frequency Selection (DFS) channels by eliminating passive scans. Clients get channel information directly from possible roam candidates. This option is disabled by default.

- channel-info-interval <6-9> – Optional. Configures the interval at which channel information is periodically retrieved from potential roam candidates without requesting scan assist.
- <6-9> – Specify the interval from 6 - 9 seconds. When enabled, the default value is 8 seconds.

### smart-scan
Enables a smart scan to refine a clients channel scans to just a few channels as opposed to all available channels. This option is disabled by default.

### wing-load-information
Enables support for the WiNG load information element (Element ID 173) with legacy Symbol Technology clients, thus making them optimally interoperable with the latest Zebra access points. This option is enabled by default.

### wmm-load-information
Enables support for WiNG Wi-Fi MultiMedia (WMM) Load Information Element in radio transmissions with legacy clients. This option is disabled by default.

### Examples
```
rfs7000-37FABE(config-wlan-test)#wing-extensions wmm-load-information
```
```
rfs7000-37FABE(config-wlan-test)#show context
wlan test
    description TestWLAN
    ssid test
    bridging-mode local
    encryption-type tkip-ccmp
    authentication-type eap
    kerberos server timeout 12
    kerberos server primary host 172.16.10.2
    accounting syslog host 172.16.10.4 port 2
    data-rates 2.4GHz gn
    wing-extensions wmm-load-information
    client-load-balancing probe-req-intvl 5ghz 5
    --More--
rfs7000-37FABE(config-wlan-test)#
```

### Related Commands

<table>
<thead>
<tr>
<th>command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables support for WiNG-specific client extensions to the IEEE 802.11x WLAN standards. Use the keywords provided to disable a specific wing-extension.</td>
</tr>
</tbody>
</table>
4.1.97.2.51 wireless-client

- wlan-mode commands

Configures the transmit power indicated to clients

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
wireless-client [count-per-radio|cred-cache-ageout|hold-time|inactivity-timeout|max-firewall-sessions|reauthentication|t5-inactivity-timeout|tx-power|vlan-cache-ageout]
```

```
wireless-client [count-per-radio <0-256>|cred-cache-ageout <60-86400>|hold-time <1-86400>|inactivity-timeout <60-86400>|max-firewall-sessions <10-10000>|reauthentication <30-86400>|t5-inactivity-timeout <60-86400>|tx-power <0-20>|vlan-cache-ageout <60-86400>]
```

```
wireless-client roam-notification [after-association|after-data-ready|auto]
```

Parameters

- wireless-client [count-per-radio <0-256>|cred-cache-ageout <60-86400>|hold-time <1-86400>|inactivity-timeout <60-86400>|max-firewall-sessions <10-10000>|reauthentication <30-86400>|t5-inactivity-timeout <60-86400>|tx-power <0-20>|vlan-cache-ageout <60-86400>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wireless-client</td>
<td>Configures the transmit power indicated to wireless clients for transmission</td>
</tr>
<tr>
<td>count-per-radio &lt;0-256&gt;</td>
<td>Configures the maximum number of clients allowed on this WLAN per radio</td>
</tr>
<tr>
<td>cred-cache-ageout &lt;60-86400&gt;</td>
<td>Configures the timeout period for which client credentials are cached across associations</td>
</tr>
<tr>
<td>hold-time &lt;1-86400&gt;</td>
<td>Configures the time period for which wireless client state information is cached post roaming</td>
</tr>
<tr>
<td>inactivity-timeout &lt;60-86400&gt;</td>
<td>Configures an inactivity timeout period in seconds. If a frame is not received from a wireless client for this period of time, the client is disassociated.</td>
</tr>
<tr>
<td>max-firewall-sessions &lt;10-10000&gt;</td>
<td>Configures the maximum firewall sessions allowed per client on a WLAN</td>
</tr>
<tr>
<td>reauthentication &lt;30-86400&gt;</td>
<td>Configures periodic reauthentication of associated clients</td>
</tr>
<tr>
<td>t5-inactivity-timeout &lt;60-86400&gt;</td>
<td>Configures and inactivity timeout, in seconds, for T5 devices. When configured, the T5 device is disassociated if the time lapsed after the last frame received from it exceeds the value specified here.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-256&gt; – Specify a value from 0 - 256.</td>
<td></td>
</tr>
<tr>
<td>&lt;60-86400&gt; – Specify a value from 60 - 86400 seconds.</td>
<td></td>
</tr>
<tr>
<td>&lt;1-86400&gt; – Specify a value from 1 - 86400 seconds.</td>
<td></td>
</tr>
<tr>
<td>&lt;60-86400&gt; – Specify a value from 60 - 86400 seconds.</td>
<td></td>
</tr>
<tr>
<td>&lt;10-10000&gt; – Specify the maximum number of firewall sessions allowed from 10 - 10000.</td>
<td></td>
</tr>
<tr>
<td>&lt;30-86400&gt; – Specify the client reauthentication interval from 30 - 86400 seconds.</td>
<td></td>
</tr>
<tr>
<td>&lt;60-86400&gt; – Specify a value from 60 - 86400 seconds. The default is 60 seconds.</td>
<td></td>
</tr>
</tbody>
</table>
tx-power <0-20> Configures the transmit power indicated to clients
  • <0-20> – Specify a value from 0 - 20 dBm.

vlan-cache-ageout <60-86400> Configures the timeout period for which client VLAN information is cached across associations.
  • <60-86400> – Specify a value from 60 - 86400 seconds.

- wireless-client roam-notification [after-association|after-data-ready|auto]
  wireless-client Configures the transmit power indicated to wireless clients for transmission
  roam-notification Configures when a roam notification is transmitted
  after-association Transmits a roam notification after a client has associated
  after-data-ready Transmits a roam notification after a client is data-ready (after completion of authentication, handshakes, etc.)
  auto Transmits a roam notification upon client association (if the client is known to have authenticated to the network)

Examples
rfs7000-37FABE(config-wlan-test)#wireless-client cred-cache-ageout 65
rfs7000-37FABE(config-wlan-test)#wireless-client hold-time 200
rfs7000-37FABE(config-wlan-test)#wireless-client max-firewall-sessions 100
rfs7000-37FABE(config-wlan-test)#wireless-client reauthentication 35
rfs7000-37FABE(config-wlan-test)#wireless-client tx-power 12
rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid testWLAN1
  vlan-pool-member 1 limit 1
  vlan-pool-member 2 limit 1
  vlan-pool-member 3 limit 1
  vlan-pool-member 4 limit 1
  vlan-pool-member 5 limit 1
  vlan-pool-member 6 limit 1
  vlan-pool-member 7 limit 1
  vlan-pool-member 8 limit 1
  vlan-pool-member 9 limit 1
  vlan-pool-member 10 limit 1
  bridging-mode local
  encryption-type none
  authentication-type none
  wireless-client hold-time 200
  wireless-client cred-cache-ageout 65
  wireless-client max-firewall-sessions 100
  protected-mgmt-frames mandatory
  wireless-client reauthentication 35
  wep64 key 1 hex 0 7465737431
  wep128 key 1 hex 0 25f6e7ed9718918a87a75acc75
  wep128 key 2 hex 0 2b3fb36924b22dffe98c86c315
  wep128 key 3 hex 0 1ebf3394431700194762ebd5b2
  wep128 key 4 hex 0 e3de75be311bd787aeac5e4e8b
  radius vlan-assignment
time-based-access days weekdays start 10:00 end 16:30
  wing-extensions wmm-load-information
  wireless-client tx-power 12
  client-load-balancing probe-req-intvl 5ghz 5
-- More--
rfs7000-37FABE(config-wlan-test)#
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes or reverts to default configured wireless client related parameters</td>
</tr>
</tbody>
</table>
4.1.97.252 wpa-wpa2

* wlan-mode commands *

Modifies TKIP-CCMP (WPA/WPA2) related parameters

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
wpa-wpa2 [exclude-wpa2-tkip|opp-pmk-caching|pmk-caching|preauthentication|server-only-authentication|psk|tkip-countermeasures|use-sha256-akm]
wpa-wpa2 [exclude-wpa2-tkip|opp-pmk-caching|pmk-caching|preauthentication|server-only-authentication|use-sha256-akm]
```

```
wpa-wpa2 handshake [attempts|init-wait|priority|timeout]
wpa-wpa2 handshake [attempts <1-5>|init-wait <5-1000000>|priority [high|normal]|timeout <10-5000> {10-5000}]
wpa-wpa2 key-rotation [broadcast|unicast] <30-86400>
wpa-wpa2 psk [0 <LINE>|2 <LINE>|<LINE>]
wpa-wpa2 tkip-countermeasures holdtime <0-65535>
```

Parameters

- `wpa-wpa2` Modifies TKIP-CCMP (WPA/WPA2) related parameters
- `exclude-wpa2-tkip` Excludes the Wi-Fi Protected Access II (WPA2) version of TKIP. It supports the WPA version of TKIP only. This option is disabled by default.
- `opp-pmk-caching` Uses opportunistic key caching (same Pairwise Master Key (PMK) across APs for fast roaming with EAP.802.1x. This option is enabled by default.
- `pmk-caching` Uses cached pair-wise master keys (fast roaming with eap/802.1x). This option is enabled by default.
- `preauthentication` Uses pre-authentication mode (WPA2 fast roaming)
- `server-only-authentication` Uses online sign up server-only-authenticated encryption network. This option is disabled by default.
- `use-sha256-akm` Uses sha256 authentication key management suite. This option is disabled by default.

- `wpa-wpa2 handshake` Configures WPA/WPA2 handshake parameters
  - `attempts <1-5>` Configures the total number of times a message is transmitted towards a non-responsive client
  - `<1-5>` — Specify a value from 1 - 5. The default is 2.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| init-wait <5-1000000> | Configures a minimum wait-time period, in microseconds, before the first handshake message is transmitted from the AP. This option is disabled by default.  
  • <5-1000000> – Specify a value from 5 - 1000000 microseconds. |
| priority [high|normal] | Configures the relative priority of handshake messages compared to other data traffic  
  • high – Treats handshake messages as high priority packets on a radio. This is the default setting.  
  • normal – Treats handshake messages as normal priority packets on a radio |
| timeout <10-5000> <10-5000> | Configures the timeout period, in milliseconds, for a handshake message to retire. Once this period is exceed, the handshake message is retired.  
  • <10-5000> – Specify a value from 10 - 5000 milliseconds. The default is 500 milliseconds.  
  • <10-5000> – Optional. Configures a different timeout between the second and third attempts |

- **wpa-wpa2 key-rotation [broadcast|unicast] <30-86400>**

- **wpa-wpa2** Modifies TKIP-CCMP (WPA/WPA2) related parameters

  - **key-rotation** Configures parameters related to periodic rotation of encryption keys. The periodic key rotation parameters are broadcast, multicast, and unicast traffic.

  - **broadcast <30-86400>** Configures the periodic rotation of keys used for broadcast and multicast traffic. This parameter specifies the interval, in seconds, at which keys are rotated. This option is disabled by default.  
    • <30-86400> – Specify a value from 30 - 86400 seconds.

  - **unicast <30-86400>** Configures a periodic interval for the rotation of keys, used for unicast traffic. This option is disabled by default.  
    • <30-86400> – Specify a value from 30 - 86400 seconds.

- **wpa-wpa2 psk [0 <LINE>|2 <LINE>|<LINE>]**

  - **psk** Configures a pre-shared key. The key options are: 0, 2, and LINE  
    • 0 <LINE> – Configures a clear text key  
    • 2 <LINE> – Configures an encrypted key  
    • <LINE> – Enter the pre-shared key either as a passphrase not exceeding 8 - 63 characters, or as a 64 character (256bit) hexadecimal value

- **wpa-wpa2 tkip-countermeasures holdtime <0-65535>**

  - **tkip-countermeasures** Configures a hold time period for implementation of TKIP counter measures  
    - **holdtime <0-65535>** Configures the amount of time a WLAN is disabled when TKIP counter measures are invoked  
      • <0-65535> – Specify a value from 0 - 65535 seconds. The default is 60 seconds.
Examples

rfs7000-37FABE(config-wlan-test)#wpa-wpa2 tkip-countermeasures hold-time 2
rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid testWLAN1
  vlan-pool-member 1 limit 1
  vlan-pool-member 2 limit 1
  vlan-pool-member 3 limit 1
  vlan-pool-member 4 limit 1
  vlan-pool-member 5 limit 1
  vlan-pool-member 6 limit 1
  vlan-pool-member 7 limit 1
  vlan-pool-member 8 limit 1
  vlan-pool-member 9 limit 1
  vlan-pool-member 10 limit 1
  bridging-mode local
  encryption-type none
  authentication-type none
  wireless-client hold-time 200
  wireless-client cred-cache-ageout 65
  wireless-client max-firewall-sessions 100
  protected-mgmt-frames mandatory
  wireless-client reauthentication 35
  wpa-wpa2 tkip-countermeasures hold-time 2
  wep64 key 1 hex 0 7465737431
  wep128 key 1 hex 0 25f6e7ed9718918a87a75acc75
  --More--
rfs7000-37FABE(config-wlan-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes or reverts to default TKIP-CCMP (WPA/WPA2) related parameters</td>
</tr>
</tbody>
</table>
4.1.97.2.53 service

▲ wlan-mode commands

Invokes service commands applicable in the WLAN configuration mode

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

service [allow-ht-only|allow-open-passpoint|cred-cache|eap-mac-mode|eap-mac-multicopy|
eap-mac-multikeys|eap-throttle|enforce-pmkid-validation|key-index|monitor|
radio-crypto|reauthentication|session-timeout|tx-deauth-on-roam-detection|
unresponsive-client|wpa-wpa2|show]

service [allow-ht-only|allow-open-passpoint|cred-cache [clear-on-4way-timeout|
clear-on-disconnect]|eap-mac-multicopy|eap-mac-multikeys|enforce-pmkid-validation|
radio-crypto|reauthentication seamless|session-timeout mac|
trans-deauth-on-roam-detection|show cli]

service eap-mac-mode [mac-always|normal]

service eap-throttle <0-254>

service key-index eap-wep-unicast <1-4>

service monitor [aaa-server|adoption|captive-portal|dhcp|dns]

service monitor [aaa-server|adoption vlan <1-4094>|captive-portal external-server]

service monitor [dhcp|dns] crm <RESOURCE-NAME> vlan <1-4094>

service unresponsive-client [attempts <1-1000>|ps-detect {threshold <1-1000>|
timeout <1-60>]]

service wpa-wpa2 exclude-ccmp

Parameters

- service [allow-ht-only|allow-open-passpoint|cred-cache [clear-on-4way-timeout|clear-
on-disconnect]|eap-mac-multicopy|eap-mac-multikeys|enforce-pmkid-validation|radio-
crypto|reauthentication seamless|session-timeout mac|trans-deauth-on-roam-detection|show cli]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>allow-ht-only</td>
<td>Only allows clients capable of High Throughput (802.11n) data rates to associate. This option is disabled by default.</td>
</tr>
<tr>
<td>allow-open-passpoint</td>
<td>Enables non-WPA2 security for passpoint WLANs. This option is disabled by default. For more information on passpoint policy and configuration, see PASSPOINT POLICY.</td>
</tr>
</tbody>
</table>
| cred-cache                | Clears credential cache based on the parameter passed
<p>| [clear-on-4way-timeout]    | • clear-on-4way-timeout – Clears cached client credentials after the 4way handshake with a client has timed out. This option is enabled by default. |
| [clear-on-disconnect]     | • clear-on-disconnect – Clears cached client credentials after the client has disconnected from the network. This option is disabled by default. |
| eap-mac-multicopy         | Enables sending of multiple copies of broadcast and unicast messages. This option is disabled by default. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>eap-mac-multikeys</code></td>
<td>Enables configuration of different key indices for MAC authentication. This option is disabled by default.</td>
</tr>
<tr>
<td><code>enforce-pmkid-validation</code></td>
<td>Validates the <em>Predictive real-time pairwise master key identifier</em> (PMKID) contained in a client’s association request against the one present in the wpa-wpa2 handshake. This option is enabled by default. This functionality is based on the <em>Proactive Key Caching</em> (PKC) extension of the 802.11 EEEE standard. Whenever a wireless client successfully authenticates with an AP it receives a <em>pairwise master key</em> (PMK). PKC allows clients to cache this PMK and reuse it for future re-authentications with the same AP. The PMK is unique for every client and is identified by the PMKID. The PMKID is a combination of the hash of the PMK, a string, the station and the MAC addresses of the AP.</td>
</tr>
<tr>
<td><code>radio-crypto</code></td>
<td>Uses radio hardware for encryption and decryption. This is applicable only for devices using <em>Counter Cipher Mode with Block Chaining Message Authentication Code Protocol</em> (CCMP) encryption mode. This option is enabled by default.</td>
</tr>
<tr>
<td><code>reauthentication seamless</code></td>
<td>Enables seamless EAP client reauthentication without disconnecting client after the session has timed out. This option is enabled by default.</td>
</tr>
<tr>
<td><code>session-timeout mac</code></td>
<td>Enables reauthentication of MAC authenticated clients without disconnecting client after the session has timed out. This option is enabled by default.</td>
</tr>
<tr>
<td><code>tx-deauth-on-roam-detection</code></td>
<td>Transmits a deauthentication on the air while disassociating a client because its roam is detected on the wired side. This option is disabled by default.</td>
</tr>
<tr>
<td><code>show cli</code></td>
<td>Displays the CLI tree of the current mode. When used in the WLAN mode, this command displays the WLAN CLI structure.</td>
</tr>
<tr>
<td>• `service eap-mac-mode [mac-always</td>
<td>normal]`</td>
</tr>
<tr>
<td><code>eap-mac-mode</code></td>
<td>Configures the EAP and/or MAC authentication mode used with this WLAN. This option is enabled by default.</td>
</tr>
<tr>
<td><code>mac-always</code></td>
<td>Enables both EAP and MAC authentication. MAC authentication is performed first, followed by EAP authentication. Clients are granted access based on the EAP authentication result. If a client does not have EAP, the MAC authentication result is used to grant access.</td>
</tr>
<tr>
<td><code>normal</code></td>
<td>Grants client access if the client clears either EAP or MAC authentication. This is the default setting.</td>
</tr>
<tr>
<td>• <code>service eap-throttle &lt;0-254&gt;</code></td>
<td>Enables EAP request throttling. Use this command to specify the maximum number of parallel EAP sessions allowed on this WLAN. Once this specified value is exceeded, all incoming EAP session requests are throttled. This option is enabled by default. <em>&lt;0-254&gt; – Specify a value from 0 - 254. This default value is 0.</em></td>
</tr>
<tr>
<td>• <code>service key-index eap-wep-unicast &lt;1-4&gt;</code></td>
<td>Configures an index with each key during EAP authentication with WEP. This option is enabled by default. <em>&lt;1-4&gt; – Select a index from 1 - 4. The default value is 1.</em></td>
</tr>
</tbody>
</table>
### wpa-wpa2 exclude-ccmp

**Service:**

Configures exclusion of CCMP requests when the authentication mode is set to tkip-ccmp. When enabled, it provides compatibility for client devices not compliant with tkip-ccmp. This option is disabled by default.

### service monitor [aaa-server|adoption vlan <1-4094>|captive-portal external-server]

<table>
<thead>
<tr>
<th><strong>Monitor</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>monitor</strong></td>
<td>Enables critical resource monitoring. In a WLAN, service monitoring enables regular monitoring of external AAA servers, captive portal servers, access point adoption, DHCP, and DNS servers. When enabled, it allows administrators to notify users of a service's availability and make resource substitutions in case of unavailability of a service.</td>
</tr>
<tr>
<td><strong>aaa-server</strong></td>
<td>Enables external AAA server failure monitoring. When enabled monitors an external RADIUS server resource’s AAA activity and ensures its adoption and availability. This feature is disabled by default.</td>
</tr>
<tr>
<td><strong>adoption vlan &lt;1-4094&gt;</strong></td>
<td>Enables adoption failure monitoring on an adopted AP. Also configures a adoption failover VLAN. This feature is disabled by default.</td>
</tr>
<tr>
<td><strong>captive-portal external-server</strong></td>
<td>Enables external captive portal server failure monitoring. When enabled, monitors externally hosted captive portal activity, and user access to the controller or service platform managed network. This feature is disabled by default.</td>
</tr>
</tbody>
</table>

### dhcp

**Service:**

Enables monitoring of a specified DHCP server. When the connection to the DHCP server is lost, captive portal users automatically migrate to a pre-defined VLAN. The feature is disabled by default.

**Note:** Use the `crm` keyword to specify the DHCP server to monitor.

### dns

**Service:**

Enables monitoring of a specified DNS server. When the connection to the DNS server is lost, captive portal users automatically migrate to a pre-defined VLAN. The feature is disabled by default.

**Note:** Use the `crm` keyword to specify the DNS server to monitor.
### GLOBAL CONFIGURATION COMMANDS 4-501

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| **crm <RESOURCE-NAME>** | This keyword is common to the 'dhcp' and 'dns' parameters.  
• **crm** – Identifies the DHCP and/or DNS server to monitor  
• **<RESOURCE-NAME>** – Specify the name of the DHCP or DNS server.  
**Note:** Once enabled, the CRM server monitors the DHCP/DNS server and updates their status as 'up' or 'down' depending on the availability of the resource. When either of these resources is down the wireless client is mapped to the failover VLAN and served with the 'no-service' page through the access point. |
| **vlan <1-4094>** | This keyword is common to the 'dhcp' and 'dns' parameters.  
After specifying the DHCP/DNS server resource, specify the failover VLAN.  
• **VLAN <1-4094>** – Configures the failover VLAN from 1 - 4094.  
**Note:** When the DHCP server resource becomes unavailable, the device falls back to the VLAN defined here. This VLAN has a DHCP server configured that provides a pool of IP addresses with a lease time less than the main DHCP server.  
**Note:** When this DNS server resource becomes unavailable, the device falls back to the VLAN defined here. This VLAN has a DNS server configured that provides DNS address resolution until the main DNS server becomes available. |
| **eap-mac-mode** | Configures handling of unresponsive clients |
| **attempts <1-1000>** | Configures the maximum number of successive packets that failed transmission  
• **<1-1000>** – Specify a value from 1 - 1000. The default is 7. |
| **ps-detect {threshold <1-1000>** | Enables the detection of power-save mode clients, whose PS stats has not been updated on the AP. This option is enabled by default.  
• **threshold** – Optional. Configures the threshold at which power-save client detection is triggered  
• **<1-1000>** – Configures the number of successive unacknowledged packets received before power-save detection is triggered. Specify a value from 1 - 1000. The default is 3. |
| **timeout <1-60>** | Configures the interval, in seconds, for successive packets not acknowledged by the client  
• **<1-60>** – Specify a value from 1 - 60 seconds. The default is 3 seconds. |

### Examples

```plaintext
rfs4000-229D58(config-wlan-test)#service allow-ht-only

rfs4000-229D58(config-wlan-test)#service monitor aaa-server

rfs4000-229D58(config-wlan-test)#show context wlan test ssid test vlan 1 bridging-mode tunnel encryption-type none authentication-type none service monitor aaa-server service allow-ht-only controller-assisted-mobility
rfs4000-229D58(config-wlan-test)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes or reverts to default WLAN settings configured using the 'service' command</td>
</tr>
</tbody>
</table>
4.1.98 wlan-qos-policy

Global Configuration Commands

Configures a WLAN QoS policy

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

wlan-qos-policy <WLAN-QOS-POLICY-NAME>

Parameters

- wlan-qos-policy <WLAN-QOS-POLICY-NAME>

Examples

rfs7000-37FABE(config)#wlan-qos-policy test
rfs7000-37FABE(config-wlan-qos-test)#?

WLAN QoS Mode commands:

- accelerated-multicast Configure accelerated multicast streams address asnd
  forwarding QoS classification
- classification Select how traffic on this WLAN must be classified
  (relative prioritization on the radio)
- multicast-mask Egress multicast mask (frames that match bypass the
  PSPqueue. This permits intercom mode operation
  without delay even in the presence of PSP clients)
- no Negate a command or set its defaults
- qos Quality of service
- rate-limit Configure traffic rate-limiting parameters on a
  per-wlan/per-client basis
-svp-prioritization Enable spectralink voice protocol support on this
  wlan
- voice-prioritization Prioritize voice client over other client (for
  non-WMM clients)
- wmm Configure 802.11e/Wireless MultiMedia parameters

clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

rfs7000-37FABE(config-wlan-qos-test)#

Related Commands

- no Removes an existing WLAN QoS Policy
NOTE: For more information on WLAN QoS policy commands, see Chapter 21, WLAN-QOS-POLICY.
4.1.99 `smart-cache-policy`

*Global Configuration Commands*

The following table lists the smart cache policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>smart-cache-policy</code></td>
<td>Creates a new smart cache policy and enters its configuration mode</td>
<td>page 4-505</td>
</tr>
<tr>
<td><code>smart-cache-policy-mode commands</code></td>
<td>Summarizes the smart cache policy configuration mode commands</td>
<td>page 4-507</td>
</tr>
</tbody>
</table>
4.1.99.1 smart-cache-policy

smart-cache-policy

Creates a new smart cache policy and enters its configuration mode.

Content caching is a mechanism that allows temporary caching of frequently accessed content on intermediate network devices. When enabled, subsequent requests for the same content are serviced from the cache locally and not fetched from originating servers, resulting in reduced bandwidth usage, lower latency, and reduced data transfers from originating servers. The WiNG smart cache policy supports both forward caching and transparent caching.

Forward content caching stores content temporarily on the local network. This locally stored content can be retrieved, when required, without routing a request to an external server on the Internet.

Transparent content caching, on the other hand, acts as an intermediary for the originating servers and returns cached content to clients as if the data originated from the associated servers. Transparent caching proxies perform server load-balancing and compression to regulate load on the originating servers and reduce bandwidth usage.

The smart cache policy also supports dynamic content caching, allowing caching of content from popular video content sharing sites, such as youtube.com, cnn.com, msn.com, etc.

Enabling content caching improves Web browsing (for data and video content) for consumers using Kiosks, tablets, and smart phones. A smart cache policy is enabled by associating it with a device or a profile.

Configure the policy’s forward proxy, transparent proxy and several additional settings before actual HTML pages can be defined for the smart caching configuration.

NOTE: Content caching is a licensed feature, supported only on the NX45XX and NX65XX series service platforms. To enable content caching on a device, use the license command (in the device-config mode) and provide the SMART-CACHE license key. For more information, see license.

NOTE: Though the NX9000 series service platforms do not support content caching, they support the configuration of smart-content caching policies that can be applied to the NX45XX and NX65XX series service platforms. The NX9000 series service platforms are capable of adopting and configuring NX45XX and NX65XX series service platforms.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

smart-cache-policy <SMART-CACHE-POLICY-NAME>

Parameters

- smart-cache-policy <SMART-CACHE-POLICY-NAME>

| <SMART-CACHE-POLICY-NAME> | Creates a new smart content cache policy. Specify the policy name. If the policy does not exist, it is created. |

Examples

nx4500-5CFA2B(config)#smart-cache-policy ?
SMART-CACHE-POLICY Name of the content caching to be configured (will be created if it does not exist)

nx4500-5CFA2B(config)#smart-cache-policy test
nx4500-5CFA2B(config-smart-cache-policy-test)#
nx4500-5CFA2B(config-smart-cache-policy-test)##
Content Cache Policy Mode commands:

access-log Log all client requests
aging Configure the refresh pattern
cache Configure cache management
forward-proxy Configure address and port for forward caching proxy
    service
http-access Configure http filter
no Negate a command or set its defaults
parent-proxy Configure parent proxy
pre-fetch Enable pre-fetching of a URL list
smart-cache Content cache
transparent-proxy Transparent caching proxy
clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

nx4500-5CFA2B(config-smart-cache-policy-test)#
4.1.99.2 smart-cache-policy-mode commands

The following table summarizes smart cache policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>access-log</td>
<td>Enables client request logging</td>
<td>page 4-508</td>
</tr>
<tr>
<td>aging</td>
<td>Configures the refresh pattern (aging parameters) for specific content types</td>
<td>page 4-509</td>
</tr>
<tr>
<td>cache</td>
<td>Configures cache management settings</td>
<td>page 4-511</td>
</tr>
<tr>
<td>forward-proxy</td>
<td>Configures the address and port for forward caching proxy service</td>
<td>page 4-513</td>
</tr>
<tr>
<td>http-access</td>
<td>Configures HTTP filters – access control lists (ACLs)</td>
<td>page 4-515</td>
</tr>
<tr>
<td>no</td>
<td>Removes or resets content cache policy settings</td>
<td>page 4-517</td>
</tr>
<tr>
<td>pre-fetch</td>
<td>Enables pre fetching of URL lists</td>
<td>page 4-518</td>
</tr>
<tr>
<td>parent-proxy</td>
<td>Enables parent proxy on this smart cache policy</td>
<td>page 4-519</td>
</tr>
<tr>
<td>smart-cache</td>
<td>Enables smart content caching</td>
<td>page 4-520</td>
</tr>
<tr>
<td>transparent-proxy</td>
<td>Configures transparent caching proxy settings</td>
<td>page 4-521</td>
</tr>
</tbody>
</table>
4.1.99.2.1 access-log

smart-cache-policy-mode commands

Enables client request logging. When enabled, this feature logs client access details to the `/var/log/smart-cache.log`. This feature is enabled by default.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

access-log {rotate <0-10> rotate-type [duration <1-100> day|size <1-100> MB]}

Parameters
- access-log {rotate <0-10> rotate-type [duration <1-100> day|size <1-100> MB]}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rotate &lt;0-10&gt;</td>
<td>Optional. Enables log file rotation, and configures the number of rotation. This is the number of log files retained (stored locally) out of the total generated.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-10&gt; – Optional. Specify the number of rotations from 0 - 10. The default is 10 rotations on every 1 MB.</td>
</tr>
<tr>
<td>rotate-type</td>
<td>Optional. Configures access log file rotation conditions, such as duration and size</td>
</tr>
<tr>
<td>[duration &lt;1-100&gt; day]</td>
<td>duration &lt;1-100&gt; – Rotates log files by time. Specify the time from 1 - 100 days. The default is 1 day.</td>
</tr>
<tr>
<td></td>
<td>size &lt;1-100&gt; – Rotates log files by file size. Specify the size from 1 - 100 MB.</td>
</tr>
</tbody>
</table>

Examples

```
nx4500-5CFA2B(config-smart-cache-policy-test)#access-log rotate 10 rotate-type duration 10 day
```

```
nx4500-5CFA2B(config-smart-cache-policy-test)#show context smart-cache-policy test
  access-log rotate 10 rotate-type duration 10 day
```

Related Commands

- **no** Disables client request logging
4.1.99.2.2 aging

smart-cache-policy-mode commands

Configures the aging rule (refresh pattern) for specific content types

The aging parameters configured are the maximum and minimum age, freshness factor, and the URL regular expressions. These parameters enable the content caching engine to determine if a given request can be processed and the content loaded from the cache or not.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
aging precedence <1-100> [<WORD>|ignore-case <WORD>] min-age <0-525600>
freshness-factor <0-100> max-age <0-525600> { (override-expire|override-lastmod|
reload-into-ims) }
```

Parameters

- **aging precedence <1-100> [<WORD]|ignore-case <WORD>] min-age <0-525600>**
  freshness-factor <0-100> max-age <0-525600> { (override-expire|override-lastmod|
  reload-into-ims) }

<table>
<thead>
<tr>
<th>aging precedence &lt;1-100&gt;</th>
<th>Configures content cache aging rules and assigns a precedence to each rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt;</td>
<td>Specifies the regular expression to match. This option is case sensitive, and is the default setting.</td>
</tr>
<tr>
<td>ignore-case &lt;WORD&gt;</td>
<td>Specifies the regular expression to match. This option is not case sensitive.</td>
</tr>
<tr>
<td>min-age &lt;0-525600&gt;</td>
<td>Configures the minimum age, in minutes, of matched objects. This value specifies the lower limit on the staleness of a response. A response is not considered stale unless its time in the cache exceeds the specified minimum value.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-525600&gt; – Specify a value from 0 - 525600 minutes. The default is 1 minute.</td>
</tr>
<tr>
<td>freshness-factor &lt;0-100&gt;</td>
<td>Configures the freshness factor of matched objects as a percentage value. freshness is an expression of how long Web content resides on the service platform's local cache before being updated or removed.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-100&gt; – Specify a value from 0 - 100%. The default is 100%.</td>
</tr>
<tr>
<td>max-age &lt;0-525600&gt;</td>
<td>Configures the maximum age, in minutes, of matched objects. This value specifies the upper limit on the freshness of a response. A response is not considered fresh unless its time in the cache is less than the specified maximum value.</td>
</tr>
</tbody>
</table>
|                         | • <0-525600> – Specify a value from 0 - 525600 minutes. The default is 525600.
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| (override-expire| override-lastmod| reload-into-ims) | Applies overrides. The options are: |
| | | | • override-expire – Optional. When selected, this option overrides the server sent explicit expiry time by the configured minimum age value. This option causes the content cache engine to check the min value before checking the Expires header. Thus, a non-zero min time makes the engine return an un-validated cache hit even if the response is pre-expired. |
| | | | • override-lastmod – Optional. When selected, this option enforces minimum age even on objects that were modified recently to force the minimum age period on recently modified cached content. This option causes the content cache engine to check the min value before the LM-factor percentage. |
| | | | • reload-into-ims – Optional. When selected, this option makes the content cache engine to transform a request with a no-cache directive into a validation (If-Modified-Since) request. In other words, the engine adds an If-Modified-Since header to the request before forwarding. Note: This works only for objects that have a Last-Modified timestamp. The outbound request retains the nocache directive, so that it reaches the originating server. |

**Examples**

nx4500-5CFA2B(config-smart-cache-policy-test)#aging precedence 1 ignore-case \\.jgp$ min-age 100 freshness-factor 75 max-age 200 reload-into-ims

nx4500-5CFA2B(config-smart-cache-policy-test)#show context smart-cache-policy test

  aging precedence 1 ignore-case \\.jgp$ min-age 100 freshness-factor 75 max-age 200 reload-into-ims

  access-log rotate 10 rotate-type duration 10 day

nx4500-5CFA2B(config-smart-cache-policy-test)#

**Related Commands**

| no | Removes an existing aging rule (refresh pattern) |
4.1.99.2.3 cache

smart-cache-policy-mode commands

Configures cache management settings
This command specifies content cache rules that determine if a content is cached or not. Use this feature to filter content before caching. By default content is not cached.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
cache [media|precedence|size]
```

```
cache media { (all|aol|bing|break|cnn|daily-motion|metacafe|vimeo|youtube) }
```

```
cache precedence <1-100> [deny|permit] { destination-domain <DOMAIN-NAME> | destination-domain-regex <WORD> | destination-ip [<IP/M]|any | source-ip <IP/M> | url-regex <URL> }
```

```
cache size <1-32>
```

Parameters

- cache media { (all|aol|bing|break|cnn|daily-motion|metacafe|vimeo|youtube) }

<table>
<thead>
<tr>
<th>cache media</th>
<th>Enables content caching from the following video content sharing sites. The sites currently supported are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• aol.com</td>
</tr>
<tr>
<td></td>
<td>• bing.com</td>
</tr>
<tr>
<td></td>
<td>• break.com</td>
</tr>
<tr>
<td></td>
<td>• dailymotion.com</td>
</tr>
<tr>
<td></td>
<td>• metacafe.com</td>
</tr>
<tr>
<td></td>
<td>• vimeo.com</td>
</tr>
<tr>
<td></td>
<td>• cnn.com</td>
</tr>
<tr>
<td></td>
<td>• youtube.com</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Select <strong>All</strong> to include the entire list of supported sites. Selected sites have their video content cached locally on the service platform and made available to clients that request the video content.</td>
</tr>
</tbody>
</table>

- cache precedence <1-100> [deny|permit] { destination-domain <DOMAIN-NAME> | destination-domain-regex <WORD> | destination-ip [<IP/M]|any | source-ip <IP/M> | url-regex <URL> }

<table>
<thead>
<tr>
<th>cache precedence &lt;1-100&gt;</th>
<th>Configures cache filtering rules that determine if a content received from the originating server is to be cached or not. You can create multiple cache filtering rules and assign precedence values to each. These rules are applied in order of their precedence.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;1-100&gt; – Specify a precedence rule from 1 - 100.</td>
</tr>
</tbody>
</table>

| [deny|permit] | Configures the deny or permit caching parameters for this rule |
|-------------|----------------------------------------------------------------|
|             | • permits – Caches content if it matches the defined permit parameters |
|             | • deny – Does not cache content if it matches the defined deny parameters |
cache size <1-32> Configures the maximum caching storage size. This is upper limit on the disk space used for storing cached contents.

Examples

```
x4500-5CFA2B(config-smart-cache-policy-test)#cache size 30

nx4500-5CFA2B(config-smart-cache-policy-test)#show context
smart-cache-policy test
  cache size 30
  aging precedence 1 ignore-case \\.jpg$ min-age 100 freshness-factor 75 max-age 200
  reload-into-ims
  access-log rotate 10 rotate-type duration 10 day

nx4500-5CFA2B(config-smart-cache-policy-test)#
```

Related Commands

```
no
```

Resets or removes cache management settings
4.1.99.2.4 forward-proxy

smart-cache-policy-mode commands

Enables forward proxy mode on this smart cache policy. This option is disabled by default.
Devices using this smart-cache policy act as a forward proxy on specified VLANs.
This command configures the IP address and port on which the forward proxy server listens for incoming HTTP
requests.
Forward content caching stores content temporarily on the local network. This locally stored content can be
retrieved, when required, without routing a request to an external server on the Internet.
Supported in the following platforms:
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530,
  NX9000, NX9500, NX9510, NX9600

Syntax

forward-proxy {ip|protocol|vlan}
forward-proxy {ip <IP> port <1-32768>}
forward-proxy {protocol [all|ftp|gopher|https]}
forward-proxy {vlan <VLAN-ID>}

Parameters

• forward-proxy {ip <IP> port <1-32768>}

| ip <IP> port <1-32768> | Optional. Configures the IP address and TCP port for forward proxying. If no IP address
| | is provided, the system uses the default smart caching proxy server’s IP (127.0.1.1).
The default port is 3128.

• forward-proxy {protocol [all|ftp|gopher|https]}

| protocol [all|ftp|gopher|https] | Optional. Selects the additional forward proxy resource protocol for smart caching. The options are:
| | • ftp – Selects FTP as the forward proxy resource protocol
| | • gopher – Selects Gopher as the forward proxy resource protocol
| | • https – Selects HTTPS as the forward proxy resource protocol
| | • all – Selects all protocols (this is the default setting)

• forward-proxy {vlan <VLAN-ID>}

| vlan <VLAN-ID> | Optional. Configures the VLAN(s) for which forward proxy mode (content caching) is
| | enabled. By default content caching is disabled on all VLANs. This option is disabled by default.
| | • <VLAN-ID> – Specify the list of VLANs.

Examples

nx4500-5CFA2B(config-smart-cache-policy-test)#forward-proxy vlan 10-20

nx4500-5CFA2B(config-smart-cache-policy-test)#show context
smart-cache-policy test
  forward-proxy vlan 10-20
  cache size 30
  aging precedence 1 ignore-case \\ .jpg$ min-age 100 freshness-factor 75 max-age 200
  reload-into-ims
  access-log rotate 10 rotate-type duration 10 day
  nx4500-5CFA2B(config-smart-cache-policy-test)#
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Reverts address and port for forward caching proxy service</td>
</tr>
</tbody>
</table>
### 4.1.99.2.5 http-access

**smart-cache-policy-mode commands**

Configures HTTP filters. This command configures rules to deny or permit HTTP access. A deny rule specifies the destination domains and source and destination IPs to deny content access. A permit rule specifies the destination domains and source and destination IPs to permit content access.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
http-access precedence <1-100> [deny|permit] {destination-domain <DOMAIN-NAME>|destination-domain-regex <WORD>|destination-ip <IP/M>|mimetype-regex <WORD>|source-ip <IP/M>|url-regex <URL>}
```

**Parameters**

- **http-access precedence <1-100> [deny|permit]**

  Configures HTTP access rules that determine if a IP address is to be accessed or not. You can create multiple HTTP access rules and assign precedence values to each. These rules are applied in order of their precedence.

  - `<1-100>` — Specify a precedence rule from 1 - 100.
  - **Note:** Lower the precedence, higher is the rule priority.

  - **[deny|permit]**

    Configures the deny or permit access parameters for this rule

    - permits — Permits access if the specified parameters are matched
    - deny — Denies access if the specified parameters are matched

- **destination-domain <DOMAIN-NAME>**

  Optional. Specifies the destination domain to match against the hostname in the HTTP request URL

  - `<DOMAIN-NAME>` — Specify the domain name.

- **destination-domain-regex <WORD>**

  Optional. Specifies a regular expression matching on originating server names

  - `<WORD>` — Specify the regular expression.

  The destination domain regex is the same as the destination domain, but the destination domain regex allows you to use standard expression matching on originating server names.

- **destination-ip [IP/M][any]**

  Optional. Specifies the destination server’s IP address, obtained from the HTTP request URL

  - `<IP/M>` — Specify the destination server’s IP address and mask. This is used as the match criteria.
  - **any** — Select to specify any destination IP address as the match criteria.

  - **Note:** Provide the IP address in the A.B.C.D/M format.

  - **Note:** Specify `any` to consider all servers.

- **mimetype-regex <WORD>**

  Optional. Specifies the regular expression used to match the mimetype of a HTTP request
source-ip \[<IP/M>|any\]  
| Optional. Specifies the source IP address (client’s IP address) that is sent out as part of the HTTP request. |
| • \(<IP/M>\) – Specify the source IP address and mask. This is used as the match criteria. |
| • any – Select to specify any source IP address as the match criteria. |
| **Note:** Provide the IP address in the A.B.C.D/M format. |
| **Note:** Specify any to consider all client requests. |

url-regex <URL>  
| Optional. Specifies regular expressions used to match any part of a requested URL, including the transfer protocol and originating server hostname. |
| • <URL> – Specify the regular expression. |

**Examples**

nx4500-5CFA2B(config-smart-cache-policy-test)#http-access precedence 4 deny destination-domain .TechPubs

nx4500-5CFA2B(config-smart-cache-policy-test)#show context
smart-cache-policy test
forward-proxy vlan 10-20
cache size 30
aging precedence 1 ignore-case \\.jgp\$ min-age 100 freshness-factor 75 max-age 200
reload-into-ims
  http-access precedence 4 deny destination-domain .TechPubs
  access-log rotate 10 rotate-type duration 10 day
nx4500-5CFA2B(config-smart-cache-policy-test)#

**Related Commands**

| no | Removes an ACL |
4.1.99.2 no

smart-cache-policy-mode commands

Removes or resets smart cache policy settings

Supported in the following platforms:

• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [access-log|aging|cache|forward-proxy|http-access|parent-proxy|pre-fetch|smart-cache|transparent-proxy]

Parameters

• no <PARAMETERS>

removes or reverts this Smart Cache policy’s settings based on the parameters passed

Examples

The following example displays the content cache policy ‘test’ settings before the no commands are executed:

```
nx4500-5CFA2B(config-smart-cache-policy-test)#show context
smart-cache-policy test
   forward-proxy vlan 10-20
   aging precedence 1 ignore-case \\.jgp\$ min-age 100 freshness-factor 75 max-age 200
   reload-into-ims
   http-access precedence 4 deny destination-domain .TechPubs
   access-log rotate 10 rotate-type duration 10 day
   nx4500-5CFA2B(config-smart-cache-policy-test)#
```

```
nx4500-5CFA2B(config-content-cache-policy-test)#no forward-proxy vlan 10-20
nx4500-5CFA2B(config-smart-cache-policy-test)#no aging precedence 1
nx4500-5CFA2B(config-smart-cache-policy-test)#no access-log rotate
```

The following example displays the content cache policy ‘test’ settings after the no commands are executed:

```
nx4500-5CFA2B(config-smart-cache-policy-test)#show context
smart-cache-policy test
    cache size 30
    http-access precedence 4 deny destination-domain .TechPubs
    nx4500-5CFA2B(config-smart-cache-policy-test)#
```
### 4.1.99.2.7 pre-fetch

**smart-cache-policy-mode commands**

Pre-fetches a specified list of URLs (whose credentials can be stored in the local cache)

This command allows the content cache engine to pre-fetch URLs specified in a URL list. The pre-fetch function is performed immediately or at a scheduled time, based on configuration.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
pre-fetch <URL-LIST-NAME> schedule <TIME>
```

**Parameters**

- `pre-fetch <URL-LIST-NAME> schedule <TIME>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;URL-LIST-NAME&gt;</code></td>
<td>Pre-fetches a list of URLs identified by the <code>&lt;URL-LIST-NAME&gt;</code> keyword. URL lists are used to select highly utilized URLs for smart caching. The selected URLs are monitored and routed according to existing cache content policies. The URL list should be existing and configured. For more information on configuring URL lists, see <code>url-list</code>.</td>
</tr>
<tr>
<td><code>schedule &lt;TIME&gt;</code></td>
<td>Pre-fetches the specified URL list at a specified time</td>
</tr>
<tr>
<td><code>&lt;TIME&gt;</code></td>
<td>Specify the time in the HH:MM format.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx4500-5CFA2B(config-content-cache-policy-test)#pre-fetch test schedule 12:30
```

```
nx4500-5CFA2B(config-content-cache-policy-test)#show context
content-cache-policy test
  forward-proxy vlan 10-20
  cache media all
  cache size 30
  http-access precedence 100 deny destination-domain test destination-domain-regexp test
  access-log rotate 10 every 50 day
  pre-fetch test schedule 12:30
nx4500-5CFA2B(config-content-cache-policy-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an ACL</td>
</tr>
</tbody>
</table>
4.1.99.2.8  parent-proxy

▶ smart-cache-policy-mode commands

Enables upper-layer parent proxy on this smart cache policy

The parent proxy server requires users to authenticate to access Web sites like WinRoute. This setting is disabled by default.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

parent-proxy [enable|host <IP/HOST-NAME> port <1-32768>]

Parameters

- parent-proxy [enable|host <IP/HOST-NAME> port <1-32768>]

<table>
<thead>
<tr>
<th>enable</th>
<th>Enables parent proxy on this smart cache policy</th>
</tr>
</thead>
</table>
| host <IP/HOST-NAME> port <1-32768> | Configures the hostname or IP address of the parent proxy server
- <IP/HOST-NAME> — Specify the parent proxy server’s IP address or hostname.
- port <1-32768> — Specify the TCP port number for the parent proxy server. The default port is 8080.

Examples

nx4500-5CFA2B(config-smart-cache-policy-test)#parent-proxy host 192.168.13.8 port 21

nx4500-5CFA2B(config-smart-cache-policy-test)#show context

parent-proxy host 192.168.13.8 port 21

http-access precedence 4 deny destination-domain .TechPubs

nx4500-5CFA2B(config-smart-cache-policy-test)#

Related Commands

| no | Disables parent proxy on this smart cache policy |
### 4.199.2.9 smart-cache

**smart-cache-policy-mode commands**

Enables smart content caching

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

smart-cache enable

**Parameters**

- smart-cache enable

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>smart-cache enable</td>
<td>Enables smart content caching. When enabled, devices using this smart-cache policy act as forward proxy.</td>
</tr>
</tbody>
</table>

**Examples**

nx4500-5CFA2B(config-smart-cache-policy-test)#smart-cache enable

nx4500-5CFA2B(config-smart-cache-policy-test)#

**Related Commands**

- no
  - Disables smart content caching
**4.1.99.2.10 transparent-proxy**

*smart-cache-policy-mode commands*

Enables the transparent proxy mode on a device. This is the default mode of proxying.

When enabled, all packets are automatically routed to the port on which the content cache engine listens (3128) by default. The advantage of the transparent proxy mode is that clients need not be configured with an explicit proxy.

Transparent content caching, on the other hand, acts as an intermediary for the originating servers and returns cached content to clients as if the data originated from the associated servers. Transparent caching proxies perform server load-balancing and compression to regulate load on the originating servers and reduce bandwidth usage.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

transparent-proxy {protocol|vlan}

transparent-proxy {protocol {all|https}}

transparent-proxy {vlan <VLAN-ID>}

**Parameters**

- transparent-proxy {protocol {all|https}}
  - protocol {all|https} Optional. Selects the protocols used for transparent proxy mode
    - https – Optional. Enables HTTPS for transparent proxy
    - all – Optional. Enables all protocols for transparent proxy
  - transparent-proxy {vlan <VLAN-ID>}
  - vlan <VLAN-ID> Optional. Configures the VLAN(s) for which transparent proxy mode (content caching) is enabled. By default content caching is disabled on all VLANs.
    - <VLAN-ID> – Specify the list of VLANs.

**Examples**

nx4500-5CFA2B(config-smart-cache-policy-test)#transparent-proxy vlan 10-20

nx4500-5CFA2B(config-smart-cache-policy-test)#show context
smart-cache-policy test
  parent-proxy host 192.168.13.8 port 21
  transparent-proxy vlan 10-20
  http-access precedence 4 deny destination-domain .TechPubs

nx4500-5CFA2B(config-smart-cache-policy-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets or removes transparent caching proxy settings</td>
</tr>
</tbody>
</table>
4.1.100  **url-filter**

**Global Configuration Commands**

The following table lists the commands that allow you to enter the URL filter configuration mode:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>url-filter</code></td>
<td>Creates a new URL filter and enters its configuration mode</td>
<td>page 4-523</td>
</tr>
<tr>
<td><code>url-filter-config-mode commands</code></td>
<td>Summarizes the URL filter configuration mode commands</td>
<td>page 4-526</td>
</tr>
</tbody>
</table>
4.1.100.1 url-filter

url-filter

Creates a new URL filter (Web filter) and enters its configuration mode. URL filtering is a licensed feature. When applied to a WiNG device the license allows you to enable URL filtering on the device, create and apply a URL filter defining the banned and/or allowed URLs. When enabled, the URL filter is applied to all user-initiated URL requests to determine if the requested URL is banned or allowed. Only if allowed is the user’s request (in the form of a HTTP request packet) forwarded to the Web server.

URL filters can be applied at any of the following points: the user’s application (browser/email reader), the network’s gateway, at the Internet service provider’s (ISP) end, and also on a Web portal. For wireless clients, the WLAN infrastructure is the best place to implement these filters.

A URL filter is a set of whitelist and/or blacklist rules. The whitelist allows access only to those Websites and URLs specified in it. All other Websites and URLs, apart from those specified in the whitelist, are banned. On the other hand, the blacklist bans all Websites and URLs specified in it. All other Websites and URLs, apart from those specified in the blacklist, are allowed.

To simplify URL filter configuration, Websites have been classified into pre-defined category-types and categories. The system provides 12 category-types and 64 categories. To further simplify configuration, these 12 category-types have been grouped into five (5) pre-defined levels. (See Usage Guidelines section for the list of category-types, categories, and levels). The actual classification of URLs (on the basis of the pre-defined factors mentioned above) is done by the classification server. A local database also helps by caching URL records for a user-defined time period. The classification server host is specified in the Web filter policy. The Web filter policy also defines the URL database parameters. For more information, see web-filter-policy.

The WiNG software also allows you to create URL lists. Each URL list contains a list of user-defined URLs. Use the URL list in a URL filter (whitelist or blacklist rule) to identify the URLs to ban or allow. For example, a URL list named SocialNetworking is created listing the following three sites: Facebook, Twitter, and LinkedIn. When applied to a URL filter’s blacklist these three sites are banned. Where as, when applied to a whitelist only these three sites are allowed. For more information on configuring a URL list, see url-list.

**NOTE:** URL filtering is a licensed feature. Procure and install the license in the device configuration mode. For more information, see license.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

```
url-filter <URL-FILTER-NAME>
```

**Parameters**

- `url-filter <URL-FILTER-NAME>`

| <URL-FILTER-NAME> | Creates a new URL filter and enters its configuration mode. Specify the URL filter name. If the filter does not exist, it is created. |
## Usage Guidelines

<table>
<thead>
<tr>
<th>Category Type</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Adult Content</td>
<td>Alcohol &amp; Tobacco, Dating &amp; Personals, Gambling, Nudity, Pornography/Sexually Explicit, Sex Education, Weapons</td>
</tr>
<tr>
<td>2 Business</td>
<td>Web-based Email</td>
</tr>
<tr>
<td>3 Communication</td>
<td>Chat, Instant Messaging</td>
</tr>
<tr>
<td>4 Entertainment</td>
<td>Streaming Media &amp; Downloads</td>
</tr>
<tr>
<td>5 File Sharing and Backup</td>
<td>Download Sites</td>
</tr>
<tr>
<td>6 Gaming</td>
<td>Games</td>
</tr>
<tr>
<td>8 Peer-to-Peer (P2P)</td>
<td>Peer to Peer</td>
</tr>
<tr>
<td>9 Questionable/Unethical</td>
<td>Child Abuse Images, Cults, Hacking, Hate &amp; Intolerance, Illegal Drug, Illegal Sharing, Illegal Software, School Cheating, Tasteless, Violence</td>
</tr>
<tr>
<td>10 Security Risk</td>
<td>Advertisement &amp; Pop-ups, Anonymizers, Botnets, Compromised, Criminal Activity, Malware, Parked Domains, Phishing &amp; Fraud, Spam Sites</td>
</tr>
<tr>
<td>11 Social and Photo Sharing</td>
<td>Social Networking</td>
</tr>
<tr>
<td>12 Software Update</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Basic</td>
<td>Blocks sites/URL categorized as Security Risk</td>
</tr>
<tr>
<td>2 Low</td>
<td>Blocks sites/URL categorized as Adult Content + Basic</td>
</tr>
<tr>
<td>3 Medium</td>
<td>Blocks sites/URL categorized as File Sharing and Backup, P2P, Questionable / Unethical + Low</td>
</tr>
<tr>
<td>4 Medium High</td>
<td>Blocks sites/URL categorized as Gaming + Medium</td>
</tr>
<tr>
<td>5 High</td>
<td>Blocks sites/URL categorized as Communication, Entertainment, Social and Photo Sharing + Medium High</td>
</tr>
</tbody>
</table>
Examples

nx4500-5CFA2B(config-url-filter-test)#?

URL Filter Mode commands:

- blacklist: Block access to URL
- blockpage: Configure blocking page parameters
- description: URL filter description
- no: Negate a command or set its defaults
- whitelist: Allow access to URL
- clrscr: Clears the display screen
- commit: Commit all changes made in this session
- do: Run commands from Exec mode
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
- help: Description of the interactive help system
- revert: Revert changes
- service: Service Commands
- show: Show running system information
- write: Write running configuration to memory or terminal

nx4500-5CFA2B(config-url-filter-test)#
4.1.100.2 url-filter-config-mode commands

The following table summarizes URL filter configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>blacklist</td>
<td>Creates a blacklist rule defining a list of banned Websites and URLs</td>
<td>page 4-527</td>
</tr>
<tr>
<td>blockpage</td>
<td>Configures the parameters that retrieve the page or content displayed by the client's browser when a requested URL is blocked and cannot be viewed</td>
<td>page 4-529</td>
</tr>
<tr>
<td>description</td>
<td>Configures an appropriate description for this URL filter</td>
<td>page 4-531</td>
</tr>
<tr>
<td>no</td>
<td>Removes this URL filter's configured parameters</td>
<td>page 4-532</td>
</tr>
<tr>
<td>whitelist</td>
<td>Creates a whitelist rule defining a list of Websites and URLs allowed access by clients.</td>
<td>page 4-533</td>
</tr>
</tbody>
</table>
4.1.100.2.1 blacklist

url-filter-config-mode commands

Creates a blacklist rule. A blacklist is a list of Websites and URLs denied access by clients. Clients requesting blacklisted URLs are presented with a page displaying the 'Web page blocked' message. Parameters relating to this page are configured using the 'blockpage' option.

URL filtering is based on the classification of Websites into pre-defined category-types. Some of the category-types are further divided into multiple categories. Currently available are 12 built-in category types, and 64 categories. These built-in category-types and categories cannot be modified.

Use the available options to identify the URL category-types and categories to include in the blacklist.

In addition to identifying URLs by the categories and category-types they are classified into, the system also provides five (5) levels of Web filtering (basic, high, low, medium, and medium-high). Each level identifies a specific set of URL categories to blacklist. For more information on category-types, categories, and URL filtering levels, see url-filter.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

blacklist [category-type|level|url-list]

blacklist category-type [adult-content|all|business|communication|entertainment|
  file-sharing-backup|gaming|news-sports-general|p2p|questionable|security-risk|
  social-photo-sharing|software-updates] precedence <1-500> {description <LINE>}

blacklist level [basic|high|low|medium|medium-high] precedence <1-500>
  {description <LINE>}

blacklist url-list <URL-LIST-NAME> precedence <1-500> {description <LINE>}

Parameters
- blacklist category-type [adult-content|all|business|communication|entertainment|
  file-sharing-backup|gaming|news-sports-general|p2p|questionable|security-risk|
  social-photo-sharing|software-updates] precedence <1-500> {description <LINE>}

| blacklist category-type <SELECT-CATEGORY-TYPE> | Selects the category-type to blacklist. A category is a pre-defined URL list available in the WiNG software. Categories are based on an external database, and cannot be modified or removed. Custom categories can be created with the URL List and added to the database. Websites have been classified into the following 12 category types: adult-content, business, communication, entertainment, file-sharing-backup, gaming, news-sports-general, p2p, questionable, security-risk, social-photo-sharing, and software-updates. Select 'all' to blacklist all category-types. Some of the category-types are further classified into categories. For example, the 'adult-content' category-type is differentiated into the following categories: alcohol-tobacco, dating-personals, gambling, nudity, pornography-sexually-explicit, sex-education, and weapons. The system blocks all categories (URLs falling within their limits) within the selected category-type. |
| precedence <1-500> | Configures the precedence value for this blacklist rule. Rules are applied in the increasing order of their precedence. Therefore, rules with lower precedence are applied first. |
## blacklist level

<table>
<thead>
<tr>
<th>blacklist level</th>
<th>basic</th>
<th>high</th>
<th>low</th>
<th>medium</th>
<th>medium-high</th>
</tr>
</thead>
</table>

Configures the Web filtering level as basic, high, low, medium, or medium-high. Each of these filter-levels are pre-configured to use a set of category types and this mapping cannot be modified.

### precedence <1-500>

Configures the precedence value for this blacklist rule. Rules are applied in the increasing order of their precedence. Therefore, rules with lower precedence are applied first.

### description <LINE>

Optional. Configures a description (not exceeding 80 characters) for this blacklist rule. Enter a description that allows you to identify the purpose of the rule.

## blacklist url-list

<table>
<thead>
<tr>
<th>blacklist url-list</th>
<th>&lt;URL-LIST-NAME&gt;</th>
</tr>
</thead>
</table>

Associates a URL list with this URL filter. When associated with a blacklist rule, all URLs listed in the specified URL list are blacklisted.

URL lists are customized categories included in the custom filter-level setting. URL lists enable an administrator to blacklist or whitelist URLs in addition to the built-in categories. For more information on configuring a URL list, see `url-list`.

### precedence <1-500>

Configures the precedence value for this blacklist rule. Rules are applied in the increasing order of their precedence. Therefore, rules with lower precedence are applied first.

### description <LINE>

Optional. Configures a description (not exceeding 80 characters) for this blacklist rule. Enter a description that allows you to identify the purpose of the rule.

## Examples

- `rfs7000-6DCD4B(config-url-filter-test)#blacklist level medium-high precedence 10`
- `rfs7000-6DCD4B(config-url-filter-test)#blacklist category-type adult-content category alcohol-tobacco precedence 1`
- `rfs7000-6DCD4B(config-url-filter-test)#blacklist category-type security-risk category botnets precedence 3`
- `rfs7000-6DCD4B(config-url-filter-test)#show context url-filter test blacklist level medium-high precedence 10 blacklist category-type security-risk category botnets precedence 3 blacklist category-type adult-content category alcohol-tobacco precedence 1`
- `rfs7000-6DCD4B(config-url-filter-test)#`

## Related Commands

| no | Removes a blacklist rule from this URL filter. Specify the category-type, category, and precedence to identify the blacklist rule. The identified rule is removed form the URL filter. |
4.1.100.2.2 blockpage

url-filter-config-mode commands

Configures the parameters that retrieve the page or content displayed by the client’s browser when a requested URL is blocked and cannot be viewed.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

blockpage [external|internal|path]

blockpage path [external|internal]

blockpage external url <URL>

blockpage internal [content|footer|header|main-logo|org-name|org-signature|small-logo|title] <LINE/IMAGE-URL>

Parameters

- **blockpage path [external|internal]**
  
  Specifies if the location of the page displayed, to the client when a requested URL is blocked, is external or internal.
  - external – Indicates the page displayed is hosted on an external Web server resource. If selecting this option, use the `blockpage > external > url <URL>` command to provide the path to the external Web server hosting the page.
  
  Note: internal – Indicates the page displayed is hosted internally. This is the default setting. If selecting this option, use the `blockpage > internal > <SELECT-PAGE-TYPE> > <LINE/IMAGE-URL>` command to define the page configuration.

- **blockpage external url <URL>**

  Configures the URL of the external Web server hosting the page (displayed to the client when a requested URL is blocked).
  - url <URL> – Specify the URL of the Web server and the blocking page name

  Valid URLs should begin with `http://` or `https://`

  The URL can contain query strings.

  Use ‘&’ or ‘?’ character to separate field-value pair.

  Enter ‘ctrl-v’ followed by ‘?’ to configure query strings.

- **blockpage internal [content|footer|header|main-logo|org-name|org-signature|small-logo|title] <LINE/IMAGE-URL>**

  Configures the internally hosted blocking page parameters, such as the content displayed, page footer and header, organization (the organization enforcing the Web page blocking) details (name, signature, and logo), and page title.
  - content – Configures the text (message) displayed on the blocking page.

  Contd...
Examples

rfs7000-6DCD4B(config-url-filter-test)#blockpage internal content "The requested Web page is blocked and cannot be displayed for viewing"

rfs7000-6DCD4B(config-url-filter-test)#show context url-filter test
  blacklist level medium-high precedence 10
  blacklist category-type security-risk category botnets precedence 3
  blacklist category-type adult-content category alcohol-tobacco precedence 1
  blockpage internal content "The requested Web page is blocked and cannot be displayed for viewing"

rfs7000-6DCD4B(config-url-filter-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the blocking page configurations</td>
</tr>
</tbody>
</table>
4.1.100.2.3 description

*url-filter-config-mode commands*

Configures a description for this URL filter. Provide a description that enables you to identify the purpose of this URL filter.

Supported in the following platforms:

- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

description <LINE>

**Parameters**

- description <LINE>

| description <LINE> | Enter an appropriate description for this URL filter. The description should identify the URL filter’s purpose and should not exceed 80 characters in length. |

**Examples**

rfs7000-6DCD4B(config-url-filter-test)#description Blacklists sites inappropriate for children and are security risks.

rfs7000-6DCD4B(config-url-filter-test)#show context
url-filter test
description "Blacklists sites inappropriate for children and are security risks."
blacklist level medium-high precedence 10
blacklist category-type security-risk category botnets precedence 3
blacklist category-type adult-content category alcohol-tobacco precedence 1
blockpage internal content "The requested Web page is blocked and cannot be displayed for viewing"

rfs7000-6DCD4B(config-url-filter-test)#

**Related Commands**

- no
  
  Removes this URL filter’s description


4.1.100.2.4 no

url-filter-config-mode commands

Use the no command to remove this URL filter’s configured parameters.

Supported in the following platforms:

- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

no [blacklist|blockpage|description|whitelist]

no blacklist [category-type|level|url-list]
no blacklist [category-type <SELECT-CATEGORY-TYPE>|level <SELECT-LEVEL>|url-list <URL-LIST-NAME>] precedence <1-500>

no blockpage [external|internal [content|footer|header|main-logo|org-name|org-signature|small-logo|title]|path]

no description

no whitelist [category-type|url-list]
no whitelist [category-type <SELECT-CATEGORY-TYPE>|url-list <URL-LIST-NAME>] precedence <1-500>

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes this URL filter’s configured parameters based on the values passed here |

Examples

The following example displays the URL filter ‘test’ settings before the ‘no’ is executed:

```
rfs7000-6DCD4B(config-url-filter-test)#show context url-filter test
description "Blacklists sites inappropriate for children and are security risks." blacklist level medium-high precedence 10
whitelist category-type communication category chat precedence 7
whitelist category-type security-risk category botnets precedence 3
blacklist category-type adult-content category alcohol-tobacco precedence 1
blockpage internal content "The requested Web page is blocked and cannot be displayed for viewing"
rfs7000-6DCD4B(config-url-filter-test)#
```

```
rfs7000-6DCD4B(config-url-filter-test)#no description
```

```
rfs7000-6DCD4B(config-url-filter-test)#no blacklist category-type adult-content category alcohol-tobacco precedence 1
```

```
rfs7000-6DCD4B(config-url-filter-test)#no whitelist category-type communication category chat precedence 7
```

The following example displays the URL filter ‘test’ settings after the ‘no’ is executed:

```
rfs7000-6DCD4B(config-url-filter-test)#show context url-filter test
blacklist level medium-high precedence 10
blacklist category-type security-risk category botnets precedence 3
blockpage internal content "The requested Web page is blocked and cannot be displayed for viewing"
rfs7000-6DCD4B(config-url-filter-test)#
```
4.1.100.2.5 whitelist

**url-filter-config-mode commands**

Creates a whitelist rule. A whitelist is a list of Websites and URLs allowed access by clients. URL filtering is based on the classification of Websites into pre-defined category-types. Some of the category-types are further divided into multiple categories. Currently available are 12 built-in category types, and 64 categories. These built-in category-types and categories cannot be modified.

Use the available options to identify the category-types and categories to include in the whitelist.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

whitelist [category-type|url-list]
whitelist category-type [adult-content|all|business|communication|entertainment|file-sharing-backup|gaming|news-sports-general|p2p|questionable|security-risk|social-photo-sharing|software-updates] precedence <1-500> {description <LINE>}
whitelist url-list <URL-LIST-NAME> precedence <1-500> {description <LINE>}

**Parameters**

- **whitelist category-type [adult-content|all|business|communication|entertainment|file-sharing-backup|gaming|news-sports-general|p2p|questionable|security-risk|social-photo-sharing|software-updates] precedence <1-500> {description <LINE>}

  Selects the category-type to add to this whitelist. A category is a pre-defined URL list available in the WiNG software. Categories are based on an external database, and cannot be modified or removed. Custom categories can be created with the URL List and added to the database.

  Websites have been classified into the following 12 category types: adult-content, business, communication, entertainment, file-sharing-backup, gaming, news-sports-general, p2p, questionable, security-risk, social-photo-sharing, and software-updates.

  Select ‘all’ to whitelist all category-types.

  Some of the category-types are further classified into categories. For example, the ‘adult-content’ category-type is differentiated into the following categories:

  - alcohol-tobacco, dating-personals, gambling, nudity, pornography-sexually-explicit, sex-education, and weapons.

  The system allows all categories (URLs falling within their limits) within the selected category-type.

- **precedence <1-500>**

  Configures the precedence value for this whitelist rule. Rules are applied in the increasing order of their precedence. Therefore, rules with lower precedence are applied first.

- **description <LINE>**

  Optional. Configures a description (not exceeding 80 characters) for this whitelist rule. Enter a description that allows you to identify the purpose of the rule.
whitelist url-list <URL-LIST-NAME> precedence <1-500> {description <LINE>}

- **whitelist url-list** *<URL-LIST-NAME>*
  Associates a URL list with this URL filter. When associated with a whitelist rule, all URLs listed in the specified URL list are allowed access. URL lists are customized categories included in the custom filter-level setting. URL lists enable an administrator to blacklist or whitelist URLs in addition to the built-in categories. For more information on configuring a URL list, see *url-list*.
  - *<URL-LIST-NAME>* – Enter URL list name (should be existing and configured)

- **precedence** <1-500>
  Configures the precedence value for this whitelist rule. Rules are applied in the increasing order of their precedence. Therefore, rules with lower precedence are applied first.

- **description <LINE>** Optional. Configures a description (not exceeding 80 characters) for this whitelist rule. Enter a description that allows you to identify the purpose of the rule.

**Examples**

```
rfs7000-6DCD4B(config-url-filter-test)#whitelist category-type communication category chat precedence 7
rfs7000-6DCD4B(config-url-filter-test)#show context url-filter test
description "Blacklists sites inappropriate for children and are security risks."
blacklist level medium-high precedence 10
whitelist category-type communication category chat precedence 7
blacklist category-type security-risk category botnets precedence 3
blacklist category-type adult-content category alcohol-tobacco precedence 1
blockpage internal content "The requested Web page is blocked and cannot be displayed for viewing"
rfs7000-6DCD4B(config-url-filter-test)#
```

**Related Commands**

- **no**
  Removes a whitelist rule from this URL filter. Specify the category-type, category, and precedence to identify the blacklist rule. The identified rule is removed from the URL filter.
4.1.101 url-list

The following table lists the commands that allow you to enter the URL list configuration mode:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>url-list</td>
<td>Creates a new URL list and enters its configuration mode</td>
<td>page 4-536</td>
</tr>
<tr>
<td>url-list-config-mode</td>
<td>Summarizes the URL list configuration mode commands</td>
<td>page 4-537</td>
</tr>
</tbody>
</table>
url-list

Creates a URL list and enters its configuration mode. After creating the URL list, add URL entries to the list. URL lists are used to pre-fetch content from the listed URLs. URL Lists are used to select highly utilized URLs for smart caching. The selected URLs are monitored and routed according to existing cache content policies. To enable pre-fetching of cached content, use the `smart-cache > pre-fetch-immediate > <URL-LIST-NAME>` command. For more information, see `smart-cache`.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

```
url-list <URL-LIST-NAME>
```

Parameters

- `url-list <URL-LIST-NAME>`

Examples

```
nx4500-5CFA2B(config)#url-list URLlist1
nx4500-5CFA2B(config-url-list-URLlist1)#?
```

URL List Mode commands:
- `description` Description of the category
- `no` Negate a command or set its defaults
- `url` Add a URL entry
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
nx4500-5CFA2B(config-url-list-URLlist1)#
```

```
nx4500-5CFA2B(config-url-list-URLlist1)#url http://www.example_company.com depth 10
```

```
nx4500-5CFA2B(config-url-list-test)#show context
url-list test
  url http://www.example_company.com depth 10
```

```
nx4500-5CFA2B(config-url-list-URLlist1)#
```
4.1.101.2 url-list-config-mode commands

- **url-list**

  The following table summarizes URL list configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Creates a blacklist rule defining a list of banned Web sites and URLs</td>
<td>page 4-538</td>
</tr>
<tr>
<td>url</td>
<td>Adds URL entries to this URL list</td>
<td>page 4-539</td>
</tr>
<tr>
<td>no</td>
<td>Removes this URL list's settings</td>
<td>page 4-540</td>
</tr>
</tbody>
</table>
4.1.101.2.1 description

* url-list-config-mode commands

Configures a description for this URL list. The description should be unique and enable you to identify the type of URLs listed in the URL list.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**
description <LINE>

**Parameters**
- description <LINE>

<table>
<thead>
<tr>
<th>Description</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide a unique description for this URL list (should not exceed 500 characters in length)</td>
<td>description &lt;LINE&gt;</td>
</tr>
</tbody>
</table>

**Examples**
nx4500-5CFA2B(config-url-list-test)#description "This URL list contains social media URLs"
nx4500-5CFA2B(config-url-list-test)#show context
description "This URL list contains social media URLs"
nx4500-5CFA2B(config-url-list-test)#

**Related Commands**
- no
  Removes this URL list’s description
4.1.101.2.2 url

▶ url-list-config-mode commands

Adds URL entries to this URL list

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax
url <WORD> {depth <1-10>}

Parameters
- url <WORD> {depth <1-10>}

<table>
<thead>
<tr>
<th>url &lt;WORD&gt; {depth &lt;1-10&gt;}</th>
<th>Adds a URL entry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;WORD&gt; – Specify the URL to add.</td>
</tr>
<tr>
<td></td>
<td>• depth – Optional. Sets number of levels to be cached. Since Web sites have different parameters to uniquely identify specific content, the same content may be stored on multiple origin servers. Smart caching uses subsets of these parameters to recognize that the content is the same and serves it from cache.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-10&gt; – Specify the depth from 1 - 10.</td>
</tr>
</tbody>
</table>

Examples
nx4500-5CFA2B(config-url-list-test)#url http://www.facebook.com

nx4500-5CFA2B(config-url-list-test)#show context url-list test
description "This URL list contains social communication URLs"
  url https://www.facebook.com depth 5
nx4500-5CFA2B(config-url-list-test)#

Related Commands

no | Removes a URL entry from this URL list
4.1.101.2.3 no

url-list-config-mode commands

Removes this URL list's settings

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax
no [description|url]
no description
no url <WORD>

Parameters
- no <PARAMETERS>

no <PARAMETERS> Removes this URL's settings based on the parameters passed

Examples
The following example displays the URL list 'test' settings before the 'no' command is executed:

```
nx4500-5CFA2B(config-url-list-test)#show context
url-list test
description "This URL list contains social communication URLs"
url https://www.facebook.com depth 5
```

nx4500-5CFA2B(config-url-list-test)#no url www.facebook.com

The following example displays the URL list 'test' settings after the 'no' command is executed:

```
nx4500-5CFA2B(config-url-list-test)#show context
url-list test
description "This URL list contains social communication URLs"
```
4.1.102 vx9000

Global Configuration Commands

Configures a Virtual WLAN Controller (V-WLC) in a virtual machine (VM) environment. V-WLC can be deployed on a shared, third-party server hardware, thereby reducing overhead costs of procuring and maintaining dedicated appliances. The external, third-party hardware needs to have installed hypervisors, such as VmWare, Xen, VirtualBox, KVM, Amazon EC2 or Hyper-V, enabling it to communicate with V-WLC software.

The V-WLC controls and manages access points and other controllers (at NOC or as a site-controller) in the network. The traffic between the access points and the V-WLC is over the layer-3 MINT protocol.

V-WLC is a licensed feature, and the WiNG software provides the following two new licenses:

- VX – When installed, this license activates VM controller instance, and enables the V-WLC to trigger adoption process allowing access points to adopt to the V-WLC. The adoption capacity of the V-WLC is determined by the number of licenses installed on it.
- VX-DEMO – This is a 60 day trial license. This license also activates VM controller instance, and enables the V-WLC to adopt access points. But, the access point adoption capacity is limited to 16. Having installed this license on a device, the only other license that you can install on it is the VX license. All existing installed licenses will continue to work as before. Since this license has a limited validity period, ensure that the system clock on the license generating tool and the device are in sync. preferably through NTP.

To install the VX or VX-DEMO license on an existing V-WLC instance, use the license command. For more information, see the examples provided in this section.

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax

vx9000 <MAC>

Parameters
- vx9000 <MAC>

vx <MAC>  Configures a V-WLC and enters its configuration mode

Note: The V-WLC configuration is the same as that of a normal controller.

Examples

nx9500-6C8809(config)#vx9000 11-22-33-44-55-66
nx9500-6C8809(config-device-11-22-33-44-55-66)#?

Device Mode commands:

- adopter-auto-provisioning-policy-lookup  Use centralized auto-provisioning policy when adopted by another controller
- adoption  Adoption configuration
- adoption-site  Set system's adoption site
- alias  Alias
- application-policy  Application Policy configuration
- area  Set name of area where the system is located
- arp  Address Resolution Protocol (ARP)
- auto-learn  Auto learning
- autogen-uniqueid  Autogenerate a unique id
- autoinstall  Autoinstall settings
- bluetooth-detection  Detect Bluetooth devices using the Bluetooth USB module - there will be interference on 2.4 Ghz radio in wlan mode
- bridge  Ethernet bridge
- captive-portal  Captive portal
- cdp  Cisco Discovery Protocol
- channel-list  Configure channel list to be advertised to wireless clients
cluster
configuration-persistence
contact
country-code
critical-resource
crypto
database
device-upgrade
dot1x
dpi
dscp-mapping
e-mail-notification
e-nvironmental-sensor
events
export
file-sync
floor
geo-coordinates
gre
hostname
http-analyze
interface
ip
ipv6
l2tpv3
l3e-lite-table
layout-coordinates
led
led-timeout
legacy-auto-downgrade
legacy-auto-update
license
lldp
load-balancing
location
logging
mac-address-table
mac-auth
mac-name
management-server
memory-profile
meshpoint-device
meshpoint-monitor-interval
min-misconfiguration-recovery-time
mint
mirror
misconfiguration-recovery-time
neighbor-inactivity-timeout

Cluster configuration
Enable persistence of configuration across reloads (startup configfile)
Configure the contact
WLAN controller configuration
Configure the country of operation
Critical Resource
Encryption related commands
Database command
Device firmware upgrade
Enable Deep-Packet-Inspection (Application Assurance)
Configure IP DSCP to 802.1p priority mapping for untagged frames
Email notification configuration
Check the firmware versions of devices before interoperating
Environmental Sensors Configuration
System event messages
Export a file
File sync between controller and adoptees
Set the floor within a area where the system is located
Configure geo coordinates for this device
GRE protocol
Set system's network name
Specify HTTP-Analysis configuration
Select an interface to configure
Internet Protocol (IP)
Internet Protocol version 6 (IPv6)
L2tpv3 protocol
L3e lite Table
Configure layout coordinates for this device
Turn LEDs on/off on the device
Configure the time for the led to turn off after the last radio state change
Enable device firmware to auto downgrade when other legacy devices are detected
Auto upgrade of legacy devices
License management command
Link Layer Discovery Protocol
Configure load balancing parameter
Configure the location
Modify message logging facilities
MAC Address Table
802.1X
Configure MAC address to name mappings
Configure management server address
Memory profile to be used on the device
Configure meshpoint device parameters
Configure meshpoint monitoring interval
Check controller connectivity after configuration is received
MiNT protocol
Mirroring
Check controller connectivity after configuration is received
Configure neighbor inactivity timeout
neighbor-info-interval
no
noc
nsight
ntp
offline-duration
override-wlan
power-config
preferred-controller-group
preferred-tunnel-controller
radius
raid
remove-override
rf-domain-manager
router
rsa-key
sensor-server
slot
spanning-tree
timezone
traffic-class-mapping
trustpoint
tunnel-controller
use
vrrp
vrrp-state-check
wep-shared-key-auth
clrscr
commit
do
end
exit
help
revert
service
show
write

nx9500-6C8809(config-device-11-22-33-44-55-66)#
vx-0099CC(config-device-00-0C-29-00-99-CC)-#license ?
   WORD Feature name (AP/AAP/ADSEC/HTANLT/SMART-CACHE/VX) for which license is to be added

vx-0099CC(config-device-00-0C-29-00-99-CC)-#license vx 80ee9649eddcc94b48b5a35d7eaf8e73b376a51649291714d04c84769b0fc4b3766816878d2739c24
vx-0099CC(config-device-00-0C-29-00-99-CC)-#com wr
Jan 16 13:48:11 2014: vx-0099CC : %SYSTEM-6-CONFIG_COMMIT: Configuration commit by user 'root' (mapsh) from 'Console'
Jan 16 13:48:11 2014: vx-0099CC : %SYSTEM-6-CONFIG_REVISION: Configuration revision updated to 9 from 8
vx-0099CC(config-device-00-0C-29-00-99-CC)-#Jan 16 13:48:12 2014: vx-0099CC : %SYSTEM-6-CONFIG_REVISION: Configuration revision updated to 10 from 9
vx-0099CC(config-device-00-0C-29-00-99-CC)-#sh licenses
Serial Number : 000C290099CC0A80001
WARNING: Recommended minimum system resource requirements not met for the current license pack or cluster configs. Please check user guide and reconfigure the system

Device Licenses:
   AP-LICENSE
      String     : 
      Value      : 10240
   AAP-LICENSE
      String     : 
      Value      : 10240
   ADVANCED-SECURITY
      String     : DEFAULT-ADV-SEC-LICENSE
   VX-LICENSE
      String     : 80ee9649eddcc94b48b5a35d7eaf8e73b376a51649291714d04c84769b0fc4b3766816878d2739c24

Cluster Licenses:
   AP-LICENSE
      Value      : 10240
      Used       : 0
   AAP-LICENSE
      Value      : 10240
      Used       : 0

Cluster MAX AP Capacity:
   Value      : 10240
   Used       : 0

Active Members:

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>SERIAL</th>
<th>LIC TYPE</th>
<th>VALUE</th>
<th>BORROWED</th>
<th>TOTAL</th>
<th>NO.APS</th>
<th>NO.AAPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-0C-29-00-99-CC 000C290099CC0A80001 AP</td>
<td>10240</td>
<td>0</td>
<td>10240</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00-0C-29-00-99-CC 000C290099CC0A80001 AAP</td>
<td>10240</td>
<td>0</td>
<td>10240</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

vx-0099CC(config-device-00-0C-29-00-99-CC)-#

Related Commands

no
   Removes a VX9000 wireless controller
This chapter describes the CLI commands used in the USER EXEC, PRIV EXEC, and GLOBAL CONFIG modes. The PRIV EXEC command set contains commands available within the USER EXEC mode. Some commands can be entered in either mode. Commands entered in either the USER EXEC or PRIV EXEC mode are referred to as EXEC mode commands. If a user or privilege is not specified, the referenced command can be entered in either mode.
5.1 Common Commands

The following table summarizes commands common to the User Exec, Priv Exec, and Global Config modes:

### Table 5.1 Commands Common to Controller CLI Modes

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
<td>page 5-3</td>
</tr>
<tr>
<td>commit</td>
<td>Commits (saves) changes made in the current session</td>
<td>page 5-4</td>
</tr>
<tr>
<td>exit</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 5-5</td>
</tr>
<tr>
<td>help</td>
<td>Displays the interactive help system</td>
<td>page 5-6</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts values to their default settings</td>
<td>page 5-9</td>
</tr>
<tr>
<td>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-12</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-13</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 5-53</td>
</tr>
<tr>
<td>write</td>
<td>Writes the system’s running configuration to memory or terminal</td>
<td>page 5-55</td>
</tr>
</tbody>
</table>

NOTE: The input parameter `<HOSTNAME>` cannot include an underscore character. In other words, a device’s hostname cannot contain an underscore.
5.1.1 clrscr

Common Commands

Clears the screen and refreshes the prompt, irrespective of the mode

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

clrscr

Parameters

None

Examples

The terminal window or screen before the clrscr command is executed:

rfs4000-229D58#device-upgrade ?

DEVICE-NAME  Name/MAC address of device
  all          Upgrade all devices
  ap621        Upgrade AP621 Device
  ap622        Upgrade AP622 Device
  ap650        Upgrade AP650 Device
  ap6511       Upgrade AP6511 Device
  ap6521       Upgrade AP6521 Device
  ap6522       Upgrade AP6522 Device
  ap6532       Upgrade AP6532 Device
  ap6562       Upgrade AP6562 Device
  ap71xx       Upgrade AP71XX Device
  ap7502       Upgrade AP7502 Device
  ap7522       Upgrade AP7522 Device
  ap7532       Upgrade AP7532 Device
  ap7562       Upgrade AP7562 Device
  ap81xx       Upgrade AP81XX Device
  ap82xx       Upgrade AP82XX Device
  ap8432       Upgrade AP8432 Device
  ap8533       Upgrade AP8533 Device
  cancel-upgrade  Cancel upgrading the device
  load-image    Load the device images to controller for device-upgrades
  rf-domain    Upgrade all devices belonging to an RF Domain
  rfs4000      Upgrade RFS4000 Device

rfs4000-229D58#

The terminal window or screen after the clrscr command is executed:

rfs4000-229D58#
5.1.2 commit

Common Commands

Commits changes made in the active session. Use the commit command to save and invoke settings entered during the current transaction.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

commit {write}{memory}

Parameters

- commit {write}{memory}

<table>
<thead>
<tr>
<th>write</th>
<th>Optional. Commits changes made in the current session</th>
</tr>
</thead>
<tbody>
<tr>
<td>memory</td>
<td>Optional. Writes to memory. This option ensures current changes persist across reboots.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE#commit write memory
[OK]
rfs7000-37FABE#
5.1.3 exit

The exit command works differently in the User Exec, Priv Exec, and Global Config modes. In the Global Config mode, it ends the current mode and moves to the previous mode, which is Priv Exec mode. The prompt changes from `(config)#` to `#`. When used in the Priv Exec and User Exec modes, the exit command ends the current session, and connection to the terminal device is terminated. If the current session has changes that have not been committed, the system prompts you to either do a commit or a revert before terminating the session.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
exit
```

Parameters

None

Examples

```
rfs7000-37FABE(config)#exit
rfs7000-37FABE#
```
5.1.4 help

Common Commands

Describes the interactive help system

Use this command to access the advanced help feature. Use “?” anytime at the command prompt to access the help topic.

Two kinds of help are provided:

• Full help is available when ready to enter a command argument
• Partial help is provided when an abbreviated argument is entered and you want to know what arguments match the input (for example ‘show ve?’).

Supported in the following platforms:

• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

help {search}

help {search <WORD>} {detailed|only-show|skip-no|skip-show}

Parameters

• help {search <WORD>} {detailed|only-show|skip-no|skip-show}

<table>
<thead>
<tr>
<th>search &lt;WORD&gt;</th>
<th>Optional. Searches for CLI commands related to a specified target term</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt; – Specify a target term (for example, a feature or a configuration parameter). After specifying the term, select one of the following options: detailed, only-show, skip-no, or skip-show. The system displays information based on the option selected.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>detailed</th>
<th>Optional. Searches and displays help strings in addition to mode and commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>only-show</td>
<td>Optional. Displays only “show” commands. Does not display configuration commands</td>
</tr>
<tr>
<td>skip-no</td>
<td>Optional. Displays only configuration commands. Does not display “no” commands</td>
</tr>
<tr>
<td>skip-show</td>
<td>Optional. Displays only configuration commands. Does not display “show” commands</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE>help search crypto detailed
found more than 64 references, showing the first 64

Context : Command
Command : clear crypto ike sa (A.B.C.D|all) (on DEVICE-NAME)
\ Clear
\ Encryption Module
\ IKE SA
\ Flush IKE SAs
\ Flush IKE SAs for a given peer
\ Flush all IKE SA
\ On AP/Controller
\ AP/Controller name

: clear crypto ipsec sa (on DEVICE-NAME)
\ Clear
\ Encryption Module
\ IPSec database
Flush IPSec SAs
On AP/Controller
AP/Controller name
: crypto key export rsa WORD URL (passphrase WORD|) (background|) ...
Encryption related commands

rfs7000-37FABE>

rfs7000-37FABE>help search crypto only-show

Context : Command
Command : show crypto cmp request status(|on DEVICE-NAME)
: show crypto ike sa (version 1|version 2|)(peer A.B.C.D|) (detail...
: show crypto ipsec sa (peer A.B.C.D|) (detail|) (on DEVICE-NAME)
: show crypto key rsa (public-key-detail) (on DEVICE-NAME)
: show crypto pki trustpoints (WORD|all|)(on DEVICE-NAME)

rfs7000-37FABE>

rfs7000-37FABE>help search service skip-show

Context : Command
Command : service block-adopter-config-update
: service clear adoption-history(on DEVICE-NAME)
: service clear captive-portal-page-upload history (on DEVICE-NAME)
: service clear command-history(on DEVICE-NAME)
: service clear device-upgrade-history (on DEVICE-NAME)
: service clear noc statistics
: service clear reboot-history(on DEVICE-NAME)
: service clear unsanctioned aps (on DEVICE-OR-DOMAIN-NAME)
: service clear upgrade-history(on DEVICE-NAME)
: service clear web-filter cache(on DEVICE-NAME)
: service clear wireless ap statistics (AA-BB-CC-DD-EE-FF) (on...
: service clear wireless client statistics (AA-BB-CC-DD-EE-FF) ...
: service clear wireless controller-mobility-database
: service clear wireless dns-cache(on DEVICE-OR-DOMAIN-NAME)
: service clear wireless radio statistics (DEVICE-NAME (<1-3>)...) ...
: service clear wireless wlan statistics (WLAN) (<1-3>) ...
: service clear xpath requests (<1-100000>)
: service show block-adopter-config-update
: service show captive-portal servers(on DEVICE-NAME)
: service show captive-portal user-cache(on DEVICE-NAME)
: service show cli
: service show client-identity-defaults
: service show command-history(on DEVICE-NAME)

rfs7000-37FABE>

rfs7000-37FABE>help search mint only-show

Found 25 references for "mint"
: show mint tunneled-vlans(|on DEVICE-NAME)
: show wireless mint client (|on DEVICE-OR-DOMAIN-NAME)
: show wireless mint client portal-candidates(|(DEVICE-NAME |<1-3>))
: show wireless mint client statistics (|on DEVICE-OR-DOMAIN-NAME)
: show wireless mint client statistics rf (|on DEVICE-OR-DOMAIN-NAME)
: show wireless mint detail (|(DEVICE-NAME |<1-3>)) (|(filter { |...
: show wireless mint links (|on DEVICE-OR-DOMAIN-NAME)
: show wireless mint portal (|on DEVICE-OR-DOMAIN-NAME)
: show wireless mint portal statistics (|on DEVICE-OR-DOMAIN-NAME)
: show wireless mint portal statistics rf (|on DEVICE-OR-DOMAIN-NAME)

rfs7000-37FABE>
5.1.5 no

Common Commands

Negates a command or sets its default. Though the `no` command is common to the User Exec, Priv Exec, and Global Config modes, it negates a different set of commands in each mode.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
no <PARAMETERS>
```

Parameters

- `no <PARAMETERS>`

| no <PARAMETERS> | The no command is common across all configuration modes and sub modes. It resets or reverts settings based on the mode in which executed. For example, when executed in the AAA policy configuration mode, it allows you to reset or revert a specific AAA policy settings. Similarly, when executed in the global configuration mode, it only resets or reverts settings configured in the global configuration mode. |

Usage Guidelines

The `no` command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

Examples

Global Config mode: No command options
Enter configuration commands, one per line. End with CTRL/Z.
```
rfs7000-37FABE(config)#no ?
aaa-policy                          Delete a aaa policy
aaa-tacacs-policy                   Delete a aaa tacacs policy
alias                              Alias
ap621                               Delete an AP621 access point
ap622                               Delete an AP622 access point
ap650                               Delete an AP650 access point
ap6511                              Delete an AP6511 access point
ap6521                              Delete an AP6521 access point
ap6522                              Delete an AP6522 access point
ap6532                              Delete an AP6532 access point
ap6562                              Delete an AP6562 access point
ap71XX                              Delete an AP71XX access point
ap7502                              Delete an AP7502 access point
ap7522                              Delete an AP7522 access point
ap7532                              Delete an AP7532 access point
ap7562                              Delete an AP7562 access point
ap81XX                              Delete an AP81XX access point
ap82XX                              Delete an AP82XX access point
ap8432                              Delete an AP8432 access point
ap8533                              Delete an AP8533 access point
application                        Delete an application
application-policy                  Delete an application policy
association-acl-policy              Delete an association-acl policy
auto-provisioning-policy            Delete an auto-provisioning policy
bonjour-gw-discovery-policy         Disable Bonjour Gateway discovery policy
bonjour-gw-forwarding-policy        Disable Bonjour Gateway Forwarding policy
bonjour-gw-query-forwarding-policy  Disable Bonjour Gateway Query Forwarding policy
captive-portal                     Delete a captive portal
```
client-identity                     Client identity (DHCP Device Fingerprinting)
client-identity-group             Client identity group (DHCP Fingerprint Database)
crypto-cmp-policy                 CMP policy
customize                         Restore the custom cli commands to default
device                            Delete multiple devices
device-categorization            Delete device categorization object
dhcp-server-policy                DHCP server policy
dhcpv6-server-policy              DHCPv6 server related configuration
dns-whitelist                     Delete a whitelist object
event-system-policy              Delete an event system policy
ex3500                            EX3500 device
ex3500-management-policy          Delete an ex3500 management policy
ex3500-gos-class-map-policy       Delete an ex3500 qos class-map policy
ex3500-gos-policy-map             Delete an ex3500 qos policy-map
ex3524                             Delete an EX3524 wireless controller
ex3548                             Delete an EX3548 wireless controller
firewall-policy                   Configure firewall policy
global-association-list          Delete a global association list
igmp-snoop-policy                 Remove device onboard igmp snoop policy
inline-password-encryption       Disable storing encryption key in the startup configuration file
ip                                 Internet Protocol (IP)
ipv6                               Internet Protocol version 6 (IPv6)
ipv6-router-advertisement-policy  IPv6 Router Advertisement related configuration
l2tpv3                             Negate a command or set its defaults
mac                                MAC configuration
management-policy                 Delete a management policy
meshpoint                         Delete a meshpoint object
meshpoint-qos-policy              Delete a mesh point QoS configuration policy
nac-list                           Delete an network access control list
nsight-policy                     Delete a nsight policy
passpoint-policy                  Delete a passpoint configuration policy
password-encryption              Disable password encryption in configuration
profile                           Delete a profile and all its associated configuration
radio-qos-policy                  Delete a radio QoS configuration policy
radius-group                      Local radius server group configuration
radius-server-policy              Remove device onboard radius policy
radius-user-pool-policy           Configure Radius User Pool
rf-domain                         Delete one or more RF-domains and all their associated configurations
rfs4000                           Delete an RFS4000 wireless controller
rfs6000                           Delete an RFS6000 wireless controller
rfs7000                           Delete an RFS7000 wireless controller
roaming-assist-policy             Delete a roaming-assist policy
role-policy                       Role based firewall policy
routing-policy                    Policy Based Routing Configuration
schedule-policy                   Delete a schedule policy
smart-rf-policy                   Delete a smart-rf-policy
t5                                 Delete a T5 wireless controller
url-filter                        Delete a url filter
url-list                          Delete a URL list
web-filter-policy                 Delete a web filter policy
wips-policy                       Delete a wips policy
wlan                              Delete a wlan object
wlan-qos-policy                   Delete a wireless lan QoS configuration policy
service                           Service Commands
rfs7000-37FABE(config)#
**COMMON COMMANDS 5-11**

**Priv Exec mode:** No command options

```
no ?
adoption  Reset adoption state of the device (& all devices adopted to it)
captive-portal  Captive portal commands
cpe  T5 CPE configuration
crypto  Encryption related commands
debug  Debugging functions
logging  Modify message logging facilities
page  Toggle paging
service  Service Commands
terminal  Set terminal line parameters
upgrade  Remove a patch
wireless  Wireless Configuration/Statistics commands
```

**rfs7000-37FABE#**

**user Exec mode:** No command options

```
no ?
adoption  Reset adoption state of the device (& all devices adopted to it)
captive-portal  Captive portal commands
crypto  Encryption related commands
debug  Debugging functions
logging  Modify message logging facilities
page  Toggle paging
service  Service Commands
terminal  Set terminal line parameters
wireless  Wireless Configuration/Statistics commands
```

**rfs7000-37FABE>**

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>User Exec Commands mode</td>
</tr>
<tr>
<td>no</td>
<td>Priv Exec Commands mode</td>
</tr>
<tr>
<td>no</td>
<td>Global Config Commands mode</td>
</tr>
</tbody>
</table>
5.1.6 revert

Reverts changes made, in the current session, to their last saved configuration

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
revert

Parameters
None

Examples
rfs7000-37FABE>revert
rfs7000-37FABE>
5.1.7 service

Common Commands

Service commands are used to view and manage configurations. The service commands and their corresponding parameters vary from mode to mode. The User Exec mode and Priv Exec mode commands provide same functionalities with a few minor changes. The Global Config service command sets the size of history files. It also enables viewing the current mode’s CLI tree.

This section consists of the following sub-sections:

- Syntax (User Exec Mode)
- Syntax (Privilege Exec Mode)
- Syntax (Privilege Exec Mode: NX9000, NX9500, and NX9510)
- Syntax (Global Config Mode)

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax (User Exec Mode)

```
service [block-adopter-config-update|clear|cli-tables-skin|cluster|delete-offline-aps|
force-send-config|force-update-vm-stats|guest-registration|load-balancing|
load-ssh-authorized-keys|locator|nsight|radio|radius|request-full-config-from-
adopter|set|show|smart-rf|ssm|snmp|syslog|wireless]

service clear [block-adopter-config-update|request-full-config-from-adopter]

service clear adoption history {on <DEVICE-NAME>}
service clear device-upgrade history {on <DOMAIN-NAME>}
service clear dpi [all|app|app-category] stats {on <DEVICE-OR-DOMAIN-NAME>}
service clear file-sync history {on <DOMAIN-NAME>}
service clear captive-portal-page-upload history {on <DOMAIN-NAME>}
service clear [command-history|reboot-history|upgrade-history|virtual-machine-history|
web-filter|wireless|xpath]
service clear adoption history {on <DEVICE-NAME>}
service clear device-upgrade history {on <DOMAIN-NAME>}
service clear dpi [all|app|app-category] stats {on <DEVICE-OR-DOMAIN-NAME>}
service clear file-sync history {on <DOMAIN-NAME>}
service clear captive-portal-page-upload history {on <DOMAIN-NAME>}
service clear [command-history|reboot-history|upgrade-history|virtual-machine-history|
{on <DEVICE-NAME>}
}
service clear noc statistics
service clear unsanctioned aps {on <DEVICE-OR-DOMAIN-NAME>}
service clear web-filter cache {on <DEVICE-NAME>}
service clear wireless [ap|client|controller-mobility-database|dns-cache|radio|wlan]
service clear wireless controller-mobility-database
service clear wireless [ap|client] statistics {<MAC> {on <DEVICE-OR-DOMAIN-NAME>}}
service clear wireless dns-cache on {on <DEVICE-OR-DOMAIN-NAME>}
service clear wireless radio statistics {<MAC/HOSTNAME> {<1-3>}}
{on <DEVICE-OR-DOMAIN-NAME>}
service clear wireless wlan statistics {<WLAN-NAME> {on <DEVICE-OR-DOMAIN-NAME>}}
service clear xpath requests {<1-100000>}

service cli-tables-skin [ansi|hashes|minimal|none|percent|stars|thick|thin|utf-8]
{grid}
service cluster force [active|configured-state|standby]
service delete-offline-aps [all|offline-for]
service delete-offline-aps offline-for days <0-999> {time <TIME>}
service force-send-config {on <DEVICE-OR-DOMAIN-NAME>}
```
service force-update-vm-stats {on <DEVICE-NAME>}

service guest-registration {backup|delete|export|import}

service guest-registration backup {delete|restore}

service guest-registration delete [all|email <EMAIL-ADD>|group <RAD-GROUP-NAME>|mac <MAC>|mobile <MOBILE-NUMBER>|name <CLIENT-FULL-NAME>|non-social|offline-for days <1-999>|otp-incomplete-for days <1-999>|social [facebook|google]|wlan <WLAN-NAME>]

service guest-registration export [csv|json] <DEST-URL> {rfdomain <DOMAIN-NAME>|time [1-Day|1-Month|1-Week|2-Hours|30-Mins|5-Hours|all]|wlan <WLAN-NAME>}

service guest-registration import format <JSON> <SOURCE-URL>

service load-balancing clear-client-capability [<MAC]|all} {on <DEVICE-NAME>}

service load-ssh-authorized-keys <PUBLIC-KEY> {on <DEVICE-NAME>}

service locator {<1-60>} {on <DEVICE-NAME>}

service nsight clear-offline [all|offline-for days <0-999> {time <TIME>}

service radio <1-3> [adaptivity|channel-switch|dfs]

service radio <1-3> adaptivity

service radio <1-3> channel-switch <36-196> [160|20|40|80|80-80]

service radio <1-3> dfs simulator-radar [extension|primary]

service radius test [<IP>|<HOSTNAME>] [<WORD>|port]

service radius test [<IP>|<HOSTNAME>] <WORD> <USERNAME> <PASSWORD> {wlan <WLAN-NAME> ssid <SSID>} {on <DEVICE-NAME>}

service radius test [<IP>|<HOSTNAME>] port <1024-65535> <WORD> <USERNAME> <PASSWORD> {wlan <WLAN-NAME> ssid <SSID>} {on <DEVICE-NAME>}

service set validation-mode [full|partial] {on <DEVICE-NAME>}


service show block-adopter-config-update

service show captive-portal [log-internal|servers|user-cache]

service show captive-portal log-internal

service show captive-portal [servers|user-cache] {on <DEVICE-NAME>}

service show [cli|client-identity-defaults|configuration-revision|mac-vendor <OUT/MAC>|noc diag|snmp session|xpath-history]

service show [command-history|crash-info|info|mem|mint|noc|pm|process|reboot-history|rf-domain-manager|sites|snmp|ssh-authorized-keys|startup-log|sysinfo|top|upgrade-history|virtual-machine-history|watch-dog|wireless|xpath-history]

service show dhcp-lease {<INTERFACE-NAME>|pppoe1|vlan <1-4094>|wwan1} {on <DEVICE-NAME>}

service show diag [led-status|psu|stats] {on <DEVICE-NAME>}

service show fast-switching {on <DEVICE-NAME>}

service show [fib|fib6] {table-id <0-255>}

service show guest-registration [export-status|import-status|restore-status]

service show mint [adopted-devices {on <DEVICE-NAME>}]|ports]

service show pm {history} {on <DEVICE-NAME>}

service show rf-domain-manager [diag|info] {<MAC/HOSTNAME>}

(service show sites?

(service show virtual-machine-history {on <DEVICE-NAME>}

(service show virtual-machine-history {on <DEVICE-NAME>}

(service show virtual-machine-history {on <DEVICE-NAME>}

(service show virtual-machine-history {on <DEVICE-NAME>}

(service show virtual-machine-history {on <DEVICE-NAME>}

(service show virtual-machine-history {on <DEVICE-NAME>}

(service show virtual-machine-history {on <DEVICE-NAME>
service show wireless [aaa-stats|adaptivity-status|client|config-internal|
  credential-cache|dns-cache|log-internal|meshpoint|neighbors|radar-status|
  radio-internal|reference|stats-client|vlan-usage]
service show wireless [aaa-stats|adaptivity-status|credential-cache|dns-cache|
  radar-status|vlan-usage] {on <DEVICE-NAME>}
service show wireless [config-internal|log-internal|neighbors]
service show wireless [client|meshpoint neighbor] proc [info|stats] {<MAC>}
  {on <DEVICE-OR-DOMAIN-NAME>}
service show wireless radio-internal [radio1|radio2] <LINE>
service show wireless reference [channels|frame|handshake|mcs-rates|reason-codes|
  status-codes]
service show wireless stats-client diag {<MAC/HOSTNAME>} {(on <DEVICE-OR-DOMAIN-
  NAME>)}

service smart-rf [clear-config|clear-history|clear-interfering-aps|save-config]
service smart-rf clear-config {<MAC>|<DEVICE-NAME>|on <DOMAIN-NAME>}
service smart-rf [clear-history]|clear-interfering-aps|save-config] {on <DOMAIN-NAME>}

service snmp sysoid wing5

service ssm [dump-core-snapshot|trace]
service ssm trace pattern <WORD> {on <DEVICE-NAME>}

service syslog test {level [0-7]|alerts|critical|debugging|emergencies|errors|
  informational|notifications|warnings}] {on <DEVICE-NAME>}

service wireless [client|dump-core-snapshot|meshpoint|qos|trace|unsanctioned|wips]

service wireless client [beacon-request|quiet-element|trigger-bss-transition|
  trigger-wmn]

service wireless client beacon-request <MAC> mode [active|passive|table]
service wireless client quiet-element [start|stop]
service wireless client trigger-bss-transition mac <MAC> {timeout <0-65535>}
  {url <URL>}
  {on <DEVICE-OR-DOMAIN-NAME>}

service wireless client trigger-wmn mac <MAC> type [deauth-imminent|
  subscription-remediation] {uri <WORD>}

service wireless dump-core-snapshot
service wireless meshpoint zi <MESHPOINT-NAME> [on <DEVICE-NAME>] {ARGS}|
  timeout <1-65535>

service wireless qos delete-tspec <MAC> tid <0-7>

service wireless trace pattern <WORD> {on <DEVICE-NAME>}

service wireless unsanctioned ap air-terminate <MAC> {on <DOMAIN-NAME>}

service wireless wips [clear-client-blacklist|clear-event-history|
  dump-managed-config]

service wireless wips clear-client-blacklist [all|mac <MAC>]

Parameters (User Exec Mode)

- service [block-adopter-config-update|request-full-config-from-adopter]

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>block-adopter-config-update</td>
<td>Blocks the configuration updates sent from the NOC server</td>
</tr>
<tr>
<td>request-full-config-from-adopter</td>
<td>Configures a request for full configuration updates from the adopter device</td>
</tr>
</tbody>
</table>

In an **hierarchically managed** (HM) network devices are deployed in two levels. The first level consists of the **Network Operations Center** (NOC) controllers. The second level consists of the site controllers that can be grouped to form clusters. The NOC controllers adopt and manage the site controllers. Access points within the network are adopted and managed by the site controllers. The adopted devices (access points and site controllers) are referred to as the adoptee. The devices adopting the adoptee are the 'adopters'.
### clear adoption history

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>clear adoption history {on &lt;DEVICE-NAME&gt;}</code></td>
<td>Clears adoption history on this device and its adopted access points. Optional. Clears adoption history on a specified device. <strong>&lt;DEVICE-NAME&gt;</strong> – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

### clear device-upgrade history

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>clear device-upgrade history {on &lt;DOMAIN-NAME&gt;}</code></td>
<td>Clears device upgrade history. Optional. Clears all firmware upgrade history in a specified RF Domain. <strong>&lt;DOMAIN-NAME&gt;</strong> – Specify the RF Domain name.</td>
</tr>
</tbody>
</table>

### clear dpi

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`clear dpi [all</td>
<td>app</td>
</tr>
</tbody>
</table>

### clear file-sync history

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>clear file-sync history {on &lt;DOMAIN-NAME&gt;}</code></td>
<td>Clears client-bridge certificate synchronization statistics. When an AP6522/AP6562 access point is configured as a client bridge, the EAP-TLS X.509 (PKCS#12) certificate is synchronized between the staging-controller and adoptee AP6522/AP6562 client-bridge access points. This command allows you to clear client-bridge certificate synchronization statistics. Optional. Clears file synchronization history on all devices within a specified RF Domain. <strong>&lt;DOMAIN-NAME&gt;</strong> – Specify the RF Domain name.</td>
</tr>
</tbody>
</table>

### clear captive-portal-page-upload history

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>clear captive-portal-page-upload history {on &lt;DOMAIN-NAME&gt;}</code></td>
<td>Clears captive portal page upload history. Optional. Clears captive portal page upload history on a specified RF Domain. <strong>&lt;DOMAIN-NAME&gt;</strong> – Specify the RF Domain name.</td>
</tr>
</tbody>
</table>
### COMMON COMMANDS 5-17

#### Service Clear Commands

- **service clear** [command-history|reboot-history|upgrade-history|virtual-machine-history] {on <DEVICE-NAME>}

  **clear [command-history|reboot-history|upgrade-history]**

  Clears command history, reboot history, or device upgrade history

  **clear virtual-machine-history**

  Clears virtual-machine history on the logged device or a specified device

  **Note:** This command is applicable only on the NX45XX, NX65XX, NX9500, and NX9510 series service platforms.

  **on <DEVICE-NAME>**

  Optional. Clears history on a specified device

  - **<DEVICE-NAME>** – Specify the name of the AP, wireless controller, or service platform.

  **Note:** When executing the clear virtual-machine-history command, provide the name of the service platform running the VMs.

- **service clear noc statistics**

  **clear noc statistics**

  Clears Network Operations Center (NOC) applicable statistics counters

- **service clear unsanctioned aps** {on <DEVICE-OR-DOMAIN-NAME>}

  **clear unsanctioned aps**

  Clears the unsanctioned APs list

  **on <DEVICE-OR-DOMAIN-NAME>**

  Optional. Clears the unsanctioned APs list on a specified device or RF Domain

  - **<DEVICE-OR-DOMAIN-NAME>** – Specify the name of the AP, wireless controller, service platform, or RF Domain.

- **service clear wireless [ap|client] {<MAC>} {on <DEVICE-OR-DOMAIN-NAME>}}

  **clear wireless [ap|client] statistics**

  Clears wireless statistics counters based on the parameters passed

  - **ap statistics** – Clears applicable AP statistics counters

  - **client statistics** – Clears applicable wireless client statistics counters

  - **<DEVICE-OR-DOMAIN-NAME>** – Specify the name of the AP, wireless controller, service platform, or RF Domain.

  **<MAC>**

  **{on <DEVICE-OR-DOMAIN-NAME>}}**

  The following keywords are common to the ‘ap’ and ‘client’ parameters:

  - **<MAC>** – Optional. Clears statistics counters for a specified AP or client. Specify the AP/client MAC address.

  - **on <DEVICE-OR-DOMAIN-NAME>** – Optional. Clears AP/client statistics counters on a specified device or RF Domain. Specify the name of the AP, wireless controller, service platform, or RF Domain.

- **service clear wireless controller-mobility-database**

  **clear wireless controller-mobility-database**

  Clears the controller assisted mobility database

- **service clear web-filter cache** {on <DEVICE-NAME>}

  **clear web-filter cache**

  Clears the cache used for Web filtering
on `<DEVICE-NAME>` Optional. Clears the Web filtering cache on a specified device
  • `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

• `service clear wireless radio statistics` `{<MAC/HOSTNAME>} {<1-3>}
  (on `<DEVICE-OR-DOMAIN-NAME>`)`

clear wireless radio statistics Clears applicable wireless radio statistics counters

`<MAC/HOSTNAME> <1-3>` Optional. Specify the MAC address or hostname of the radio, or append the interface number to form the radio ID in the AA-BB-CC-DD-EE-FF:RX or HOSTNAME:RX format.
  • `<1-3>` – Optional. Specify the radio interface index, if not specified as part of the radio ID.

on `<DEVICE-OR-DOMAIN-NAME>` Optional. This is a recursive parameter, which clears wireless radio statistics on a specified device or RF Domain. Specify the name of the device.
  • `<DEVICE-OR-DOMAIN-NAME>` – Specify the name of the AP, wireless controller, service platform, or RF Domain.

• `service clear wireless wlan statistics` `{<WLAN-NAME>}
  (on `<DEVICE-OR-DOMAIN-NAME>`)`

clear wireless wlan statistics Clears WLAN statistics counters

`<WLAN-NAME>` Optional. Clears statistics counters on a specified WLAN. Specify the WLAN name.

on `<DEVICE-OR-DOMAIN-NAME>` Optional. This is a recursive parameter, which clears WLAN statistics on a specified device or RF Domain. Specify the name of the device.
  • `<DEVICE-OR-DOMAIN-NAME>` – Specify the name of the AP, wireless controller, service platform, or RF Domain.

• `service clear xpath requests` `{<1-100000>}`

clear xpath Clears XPATH related information
requests Clears pending XPATH get requests

`<1-100000>` Optional. Specifies the session number (cookie from show sessions)
  • `<1-100000>` – Specify the session number from 1 - 100000.
  **Note:** Omits clearing the current session’s pending XPATH get requests.

• `service cli-tables-skin` `{ansi|hashes|minimal|none|percent|stars|thick|thin|utf-8}
  (grid)`

cli-tables-skin Selects a formatting layout or skin for CLI tabular outputs
  [ansi|hashes|minimal|none|percent|stars|thick|thin|utf-8]

  • `ansi` – Uses ANSI characters for borders
  • `hashes` – Uses hashes (#) for borders
  • `minimal` – Uses one horizontal line between title and data rows
  • `none` – Displays space separated items with no decoration
  • `percent` – Uses the percent sign (%) for borders

Contd..
<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>service cluster force [active</td>
<td>configured-state</td>
</tr>
<tr>
<td>force</td>
<td>Forces action commands on a cluster (active, configured-state, and standby)</td>
</tr>
<tr>
<td>active</td>
<td>Changes the cluster run status to active</td>
</tr>
<tr>
<td>configured-state</td>
<td>Restores a cluster to the configured state</td>
</tr>
<tr>
<td>standby</td>
<td>Changes the cluster run status to standby</td>
</tr>
<tr>
<td>service delete-offline-aps all</td>
<td>Deletes all off-line access points</td>
</tr>
<tr>
<td>delete-offline-aps all</td>
<td>Deletes off-line access points for a specified interval</td>
</tr>
<tr>
<td>delete-offline-aps offline-for days &lt;0-999&gt; {time &lt;TIME&gt;}</td>
<td>Deletes off-line access points for a specified number of days or time</td>
</tr>
<tr>
<td>delete-offline-aps</td>
<td>Deletes off-line access points for a specified interval</td>
</tr>
<tr>
<td>day &lt;0-999&gt;</td>
<td>Deletes off-line access points for a specified number of days</td>
</tr>
<tr>
<td>time &lt;TIME&gt;</td>
<td>Deletes off-line access points for a specified time</td>
</tr>
<tr>
<td>service force-send-config {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>Resends configuration to device(s)</td>
</tr>
<tr>
<td>force-send-config</td>
<td>Resends configuration to device(s)</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Resends configuration to a specified device or all devices in a specified RF Domain</td>
</tr>
<tr>
<td>service force-update-vm-stats {on &lt;DEVICE-NAME&gt;}</td>
<td>Forcefully pushes VM statistics on to the NOC</td>
</tr>
<tr>
<td>force-update-vm-stats</td>
<td>Forcefully pushes VM statistics on to the NOC</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Executes the command on a specified device</td>
</tr>
<tr>
<td>service guest-registration backup [delete</td>
<td>restore]</td>
</tr>
<tr>
<td>guest-registration backup [delete</td>
<td>restore]</td>
</tr>
</tbody>
</table>

**Note:** To view the status of the restore process, use the `service > show > guest-registration > restore-status` command.
service guest-registration delete [all|email <EMAIL-ADD>|group <RAD-GROUP-NAME>|mac <MAC>|mobile <MOBILE-NUMBER>|name <CLIENT-FULL-NAME>|on-social|offline-for days <1-999>|wlan <WLAN-NAME>|otp-incomplete-for days <1-999>|social [facebook|google]

Deletes a specified user or all user records from the guest-registration database. To delete a specific user, use one of the following options as an identification parameter: email, group, mac, mobile number, name, offline-for, wlan, otp-incomplete-for, or social.

Following are the user filtering options: The user identified by one of the following parameters is deleted from the guest-registration database.
- email <EMAIL-ADD> – Identifies user by the e-mail address
  - <EMAIL-ADD> – Provide the user’s e-mail address.
- mac <MAC> – Identifies user by the MAC address
  - <MAC> – Provide the user’s MAC address.
- group <RAD-GROUP-NAME> – Identifies users by their RADIUS group association
  - <RAD-GROUP-NAME> – Specify the RADIUS group name.
- mobile <MOBILE-NUMBER> – Identifies user by the registered mobile number
  - <MOBILE-NUMBER> – Provide the user’s mobile number.
- name <CLIENT-FULL-NAME> – Identifies user by the registered full name
  - <CLIENT-FULL-NAME> – Provide the user’s full name.
- non-social – Identifies users not registered through social authentication
- offline-for days <1-999> – Filters users who have not accessed the network for a specified number of days
  - days <1-999> – Specify the number of days from 1 - 999.
- wlan <WLAN-NAME> – Identifies users accessing a specified WLAN
  - <WLAN-NAME> – Specify the WLAN name.
- otp-incomplete-for days <1-999> – Identifies records of users that have not used their one-time-password (OTP) to complete registration within a specified number of days
  - days <1-999> – Specify the number of days from 1 - 999.
- social [facebook|google] – Identifies users using either Facebook or Google credentials to access the network
  - facebook – Identifies users using Facebook authentication
  - google – Identifies users using Google authentication

service guest-registration export format [csv|json] <DEST-URL> { (rfdomain <DOMAIN-NAME>|time [1-Day|1-Month|1-Week|2-Hours|30-Mins|5-Hours|all]|wlan <WLAN-NAME>) }

Exports guest registration user data files in the Comma-Separated Values (CSV) or JavaScript Object Notation (JSON) format. Use the ‘rfdomain’, ‘wlan’, and ‘time’ options to filter users for a specified RF Domain, WLAN, and/or time period. These are recursive parameters and you can apply all or any of these three filters.

format [csv|json]

Specifies the file format. The options are:
- csv – Exports user data files in the CSV format
- json – Exports user data files in the JSON format
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;DEST-URL&gt;</code></td>
<td>Configures the destination URL. The files are exported to the specified location. Both IPv4 and IPv6 address formats are supported.</td>
</tr>
<tr>
<td></td>
<td><strong>IPv4 URLs:</strong> &lt;br&gt; tftp://&lt;hostname</td>
</tr>
<tr>
<td>rdomain <code>&lt;DOMIAN-NAME&gt;</code></td>
<td>Optional. Filters user data based on RF Domain name. Only the filtered data are exported.  &lt;br&gt; • <code>&lt;DOMIAN-NAME&gt;</code> – Specify the RF Domain name.</td>
</tr>
<tr>
<td>wlan <code>&lt;WLAN-NAME&gt;</code></td>
<td>Optional. Filters user data based on WLAN name. Only the filtered data are exported. &lt;br&gt; • <code>&lt;WLAN-NAME&gt;</code> – Specify the WLAN name.</td>
</tr>
<tr>
<td>time [1-Day</td>
<td>1-Month</td>
</tr>
<tr>
<td></td>
<td><strong>service guest-registration import format json <code>&lt;SOURCE-URL&gt;</code></strong></td>
</tr>
<tr>
<td>service guest-registration import</td>
<td>Imports user data from a specified location</td>
</tr>
<tr>
<td>format json</td>
<td>Specifies the file format &lt;br&gt; • json – Imports user data files in the JSON format</td>
</tr>
<tr>
<td><code>&lt;SOURCE-URL&gt;</code></td>
<td>Configures the Source URL. The files are imported from the specified location. Both IPv4 and IPv6 address formats are supported.</td>
</tr>
<tr>
<td></td>
<td><strong>IPv4 URLs:</strong> &lt;br&gt; tftp://&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>**service load-balancing clear-client-capability [&lt;MAC]</td>
</tr>
<tr>
<td>load-balancing</td>
<td>Enables wireless load balancing by clearing client capability records</td>
</tr>
</tbody>
</table>
| clear-client-capability [<MAC>][all] | Clears a specified client or all client’s capability records  
|-------------------------------------|---------------------------------------------------------------  
| <MAC> – Clears capability records of a specified client. Specify the client’s MAC address in the AA-BB-CC-DD-EE-FF format.  
| all – Clears the capability records of all clients  
| on <DEVICE-NAME> | Optional. Clears client capability records on a specified device  
| <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.  
| load-ssh-authorized-keys <PUBLIC-KEY> [on <DEVICE-NAME>] | Loads SSH public (client) key on a device  
| <PUBLIC-KEY> | Enter the public key. The public key should be in the OpenSSH rsa/dsa format.  
| on <DEVICE-NAME> | Optional. Loads the specified public key on a specified device  
| <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.  
| locator {<1-60>} {on <DEVICE-NAME>} | Enables LEDs  
| <1-60> | Sets LED flashing time from 1 - 60 seconds.  
| on <DEVICE-NAME> | The following keyword is recursive and common to the <1-60> parameter:  
| <DEVICE-NAME> | Optional. Enables LEDs on a specified device  
| <DEVICE-NAME> – Specify name of the AP, wireless controller, or service platform.  
| nsight clear-offline [all|offline-for days <0-999> {time <TIME>} | Clears NSight data received from offline controllers, based on the parameters passed. Select one of the following options:  
| all – Clears NSight data received from all offline controllers  
| offline-for days <0-999> time <TIME> – Clears NSight data received from controllers that have been offline for a specified time period  
| days <0-999> – Specifies the number of days controllers have been offline  
| <0-999> – Specify the number of days from 0 - 999 days. Select “0” to identify controllers offline less than 24 hours.  
| time <TIME> – Optional. Specifies the total time for which controllers have been offline  
| <TIME> – Specify the time in HH:MM:SS format.  
| Note: This command is applicable only to the NX9XXX and NX9600 service platforms.  
| service radio <1-3> adaptivity | Configures radio’s parameters  
| <1-3> – Specify the radio index from 1 - 3.  
| adaptivity | Simulates the presence of interference on the current channel |
- **service radio <1-3> channel-switch <36-196> [160|20|40|80|80-80]**

  | **radio <1-3>** | Configures radio's parameters  
  | - <1-3> – Specify the radio index from 1 - 3. |

  | **channel-switch <36-196> [160|20|40|80|80-80]** | Enables channel switching  
  | - <36-196> – Specifies the channel to switch to from 36 - 196.  
  | - 160|20|40|80|80-80 – Specifies the bandwidth for the above specified channel. Select the appropriate option. |

- **service radio <1-3> dfs simulate-radar [extension|primary]**

  | **radio <1-3>** | Configures radio's parameters  
  | - <1-3> – Specify the radio index from 1 - 3. |

  | **dfs** | Enables *Dynamic Frequency Selection* (DFS) |

  | **simulate-radar [extension|primary]** | Simulates the presence of a radar on a channel. Select the channel type from the following options:  
  | - extension – Simulates a radar on the radio’s current extension channel  
  | - primary – Simulates a radar on the radio’s current primary channel |

- **service radius test [<IP>|<HOSTNAME>] <WORD> <USERNAME> <PASSWORD> {wlan <WLAN-NAME> ssid <SSID>} {(on <DEVICE-NAME>)}**

  | **radius test** | Tests RADIUS server’s account. This command sends an access-request packet to the RADIUS server. Use this command to confirm time and data/bandwidth parameters for valid wireless clients.  
  | - test – Tests the RADIUS server’s account with user provided parameters |

  | **[<IP>|<HOSTNAME>]** | Sets the RADIUS server’s IP address or hostname  
  | - <IP> – Specifies the RADIUS server’s IP address  
  | - <HOSTNAME> – Specifies the RADIUS server’s hostname |

  | **<WORD>** | Specify the RADIUS server’s shared secret. |

  | **<USERNAME>** | Specify username for authentication. |

  | **<PASSWORD>** | Specify the password. |

  | **wlan <WLAN-NAME> ssid <SSID>** | Optional. Tests the RADIUS server on the local WLAN. Specify the local WLAN name.  
  | - ssid <SSID> – Specify the local RADIUS server’s SSID. |

  | **on <DEVICE-NAME>** | Optional. This is a recursive parameter also applicable to the WLAN parameter. Performs tests on a specified device  
  | - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

- **service radius test [<IP>|<HOSTNAME>] port 1024-65535 <WORD> <USERNAME> <PASSWORD> {wlan <WLAN-NAME> ssid <SSID>} {(on <DEVICE-NAME>)}**

  | **radius test** | Tests a RADIUS server’s account. This command sends an access-request packet to the RADIUS server. Use this command to confirm time and data/bandwidth parameters for valid wireless clients.  
  | - test – Tests the RADIUS server’s account with user provided parameters |
### service set validation-mode [full|partial] \{on <DEVICE-NAME>\}

| [<IP>|<HOSTNAME>] | Sets the IP address or hostname of the RADIUS server  
| • <IP> – Specify the RADIUS server’s IP address.  
| • <HOSTNAME> – Specify the RADIUS server’s hostname. |
| port <1024-65535> | Specify the RADIUS server port from 1024 - 65535. The default port is 1812. |
| <WORD> | Specify the RADIUS server’s shared secret. |
| <USERNAME> | Specify username for authentication. |
| <PASSWORD> | Specify the password. |
| wlan <WLAN-NAME> ssid <SSID> | Optional. Tests the RADIUS server on the local WLAN. Specify the local WLAN name.  
| • ssid <SSID> – Specify the RADIUS server’s SSID. |
| on <DEVICE-NAME> | Optional. This is a recursive parameter also applicable to the WLAN parameter. Performs tests on a specified device  
| • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

### show Displays running system statistics based on the parameters passed

| block-adopter-config-update | Displays NOC configuration blocking status |
| show captive-portal log-internal | Displays recent captive portal debug logs (information and above severity level) |

### service show captive-portal [servers|user-cache] \{on <DEVICE-NAME>\}

| show captive-portal | Displays captive portal information |
| servers | Displays server information for active captive portals |
| user-cache | Displays cached user details for a captive portal |
| on <DEVICE-NAME> | Optional. Displays server information or cached user details on a specified device  
| • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
- `service show [cli|client-identity-defaults|configuration-revision|mac-user-import-status|mac-vendor <OUI/MAC>|noc diag|snmp session|xpath-history]`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show</code></td>
<td>Displays running system statistics based on the parameters passed</td>
</tr>
<tr>
<td><code>cli</code></td>
<td>Displays CLI tree of the current mode</td>
</tr>
<tr>
<td><code>client-identity-defaults</code></td>
<td>Displays default client-identities and their configuration</td>
</tr>
<tr>
<td><code>configuration-revision</code></td>
<td>Displays current configuration revision number</td>
</tr>
<tr>
<td><code>mac-user-import-status</code></td>
<td>Displays status of file import initiated by a MAC-user</td>
</tr>
<tr>
<td><code>mac-vendor &lt;OUI/MAC&gt;</code></td>
<td>Displays vendor name for a specified MAC address or <em>Organizationally Unique Identifier</em> (OUI) part of the MAC address</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;OUI/MAC&gt;</code> – Specify the MAC address or its OUI. The first six digits of the MAC address is the OUI. Use the AABBCC or AA-BB-CC format to provide the OUI.</td>
</tr>
<tr>
<td><code>noc diag</code></td>
<td>Displays NOC diagnostic details</td>
</tr>
<tr>
<td><code>snmp session</code></td>
<td>Displays SNMP session details</td>
</tr>
<tr>
<td><code>xpath-history</code></td>
<td>Displays XPath history</td>
</tr>
</tbody>
</table>

- `service show [command-history|crash-info|info|mem|process|reboot-history|startup-log|ssh-authorized-keys|sysinfo|top|upgrade-history|watchdog] {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show</code></td>
<td>Displays running system statistics based on the parameters passed</td>
</tr>
<tr>
<td><code>command-history</code></td>
<td>Displays command history (lists all commands executed)</td>
</tr>
<tr>
<td><code>crash-info</code></td>
<td>Displays information about core, panic, and AP dump files</td>
</tr>
<tr>
<td><code>info</code></td>
<td>Displays snapshot of available support information</td>
</tr>
<tr>
<td><code>mem</code></td>
<td>Displays a system’s current memory usage (displays the total memory and available memory)</td>
</tr>
<tr>
<td><code>process</code></td>
<td>Displays active system process information (displays all processes currently running on the system)</td>
</tr>
<tr>
<td><code>reboot-history</code></td>
<td>Displays the device’s reboot history</td>
</tr>
<tr>
<td><code>startup-log</code></td>
<td>Displays the device’s startup log</td>
</tr>
<tr>
<td><code>ssh-authorized-keys</code></td>
<td>Displays all devices (device hostnames) that have ssh authorized keys loaded</td>
</tr>
<tr>
<td><code>sysinfo</code></td>
<td>Displays system’s memory usage information</td>
</tr>
<tr>
<td><code>top</code></td>
<td>Displays system resource information</td>
</tr>
<tr>
<td><code>upgrade-history</code></td>
<td>Displays the device’s upgrade history (displays details, such as date, time, and status of the upgrade, old version, new version, etc.)</td>
</tr>
<tr>
<td><code>watchdog</code></td>
<td>Displays the device’s watchdog status</td>
</tr>
</tbody>
</table>
The following keywords are common to all of the above:
- **on <DEVICE-NAME>** – Optional. Displays information for a specified device. If no device is specified, the system displays information for logged device(s).
- **<DEVICE-NAME>** – Specify the name of the AP, wireless controller, or service platform.

### service show dhcp-lease

<table>
<thead>
<tr>
<th>show dhcp-lease</th>
<th>Displays DHCP lease information received from the server</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&lt;INTERFACE-NAME&gt;</strong></td>
<td>Optional. Displays DHCP lease information for a specified router interface</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays DHCP lease information for a specified device</td>
</tr>
<tr>
<td>pppoe1</td>
<td>Optional. Displays DHCP lease information for a PPP over Ethernet interface</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Optional. Displays DHCP lease information for a VLAN interface</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays DHCP lease information for a specified device. If no device is specified, the system displays information for the logged device.</td>
</tr>
<tr>
<td>wwan1</td>
<td>Optional. Displays DHCP lease information for a Wireless WAN interface</td>
</tr>
</tbody>
</table>

### service show diag

| show diag [led-status|psu|stats] | Displays running system statistics based on the parameters passed |
|-----------------------------|--------------------------------------------------------|
| on <DEVICE-NAME> | Optional. Displays diagnostic statistics for a specified device. If no device is specified, the system displays information for the logged device. |
| <DEVICE-NAME> | Specify the name of the AP, wireless controller, or service platform. |
| diag | Displays diagnostic statistics, such as LED status, fan speed, and sensor temperature |
| led-status | Displays LED state variables and the current state |
| psu | Displays power supply information |
| stats | Displays fan speed and sensor temperature statistics |

### service show guest-registration

| show guest-registration [export-status|import-status|restore-status] | Displays status of the guest-registration database snapshot related processes (export, import, and restore) |
|-----------------------------|--------------------------------------------------------|
| on <DEVICE-NAME> | Optional. Displays diagnostic statistics for a specified device. If no device is specified, the system displays information for the logged device. |
| <DEVICE-NAME> | Specify the name of the AP, wireless controller, or service platform. |
| guest-registration | Displays status of the guest-registration database snapshot related processes (export, import, and restore) |
| export-status | Displays the status of the latest export process initiated |

**Note:** To export, import, or restore a guest-registration database, use the `service > guest-registration > [backup|export|import]` command.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>import-status</td>
<td>Displays the status of the latest import process initiated</td>
</tr>
<tr>
<td>export-status</td>
<td>Displays the status of the latest restore process initiated</td>
</tr>
<tr>
<td>service show fast-switching {on &lt;DEVICE-NAME&gt;}</td>
<td>Displays fast switching state (enabled or disabled)</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays fast switching state for a specified device. If no device is specified, the system displays information for the logged device.</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system statistics based on the parameters passed</td>
</tr>
<tr>
<td>fast-switching</td>
<td>Displays running system statistics based on the parameters passed</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Displays fast switching state (enabled or disabled)</td>
</tr>
<tr>
<td>fib</td>
<td>Displays entries in the Forwarding Information Base (FIB)</td>
</tr>
<tr>
<td>fib6</td>
<td>Displays FIB IPv6 static routing entries</td>
</tr>
<tr>
<td></td>
<td>The WiNG software allows the IPv6 FIB to maintain only IPv6 static and interface routes.</td>
</tr>
<tr>
<td></td>
<td>FIB is a collection of routing entries. A route entry consists of IPv6 network (which can also be a host) address, the prefix length for the network (for IPv6 routes this is between 0 - 128), and the next hop's (gateway) IPv6 address. Since a destination can be reached through multiple next hops, you can configure multiple routes to the same destination with multiple next hops.</td>
</tr>
<tr>
<td>table-id &lt;0-255&gt;</td>
<td>Optional. Displays FIB information maintained by the system based on the table ID</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-255&gt; – Specify the table ID from 0 - 255.</td>
</tr>
<tr>
<td>service show mint [adopted-devices {on &lt;DEVICE-NAME&gt;}</td>
<td>Displays MiNT protocol details</td>
</tr>
<tr>
<td>adopted-devices on &lt;DEVICE-NAME&gt;</td>
<td>Displays adopted devices status in dpd2</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays MiNT protocol details for a specified device. If no device is specified, the system displays information for the logged device.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td>ports</td>
<td>Displays MiNT ports used by various services and features</td>
</tr>
<tr>
<td>service show pm {history} {(on &lt;DEVICE-NAME&gt;)}</td>
<td>Displays running system statistics based on the parameters passed</td>
</tr>
<tr>
<td>pm</td>
<td>Displays the Process Monitor (PM) controlled process details</td>
</tr>
<tr>
<td>history</td>
<td>Optional. Displays process change history (the time at which the change was implemented, and the events that triggered the change)</td>
</tr>
</tbody>
</table>
on `<DEVICE-NAME>`

Optional. Displays process change history for a specified device. If no device is specified, the system displays information for the logged device.
- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

- `service show rf-domain-manager [diag|info] {<MAC/HOSTNAME>} {(on <DEVICE-OR-DOMAIN-NAME>)}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show</code></td>
<td>Displays running system statistics based on the parameters passed</td>
</tr>
<tr>
<td><code>rf-domain-manager</code></td>
<td>Displays RF Domain manager information</td>
</tr>
<tr>
<td><code>diag</code></td>
<td>Displays RF Domain manager related diagnostics statistics</td>
</tr>
<tr>
<td><code>info</code></td>
<td>The following keyword is common to the ‘diag’ and ‘info’ parameters:</td>
</tr>
<tr>
<td></td>
<td>Displays RF Domain manager related information</td>
</tr>
<tr>
<td><code>&lt;MAC/HOSTNAME&gt;</code></td>
<td>Optional. Specify the MAC address or hostname of the RF Domain manager.</td>
</tr>
</tbody>
</table>

on `<DEVICE-OR-DOMAIN-NAME>`

The following keyword is common to the ‘diag’ and ‘info’ parameters:
- `<DEVICE-OR-DOMAIN-NAME>` – Specify the name of the AP, wireless controller, service platform, or RF Domain.

- `service show sites`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show</code></td>
<td>Displays running system statistics based on the parameters passed</td>
</tr>
<tr>
<td><code>sites</code></td>
<td>Displays NOC sites related information</td>
</tr>
</tbody>
</table>

- `service show virtual-machine-history {on `<DEVICE-NAME>`}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show virtual-machine-history</code></td>
<td>Displays virtual machine history based on the parameters passed</td>
</tr>
<tr>
<td>Note</td>
<td>This command is applicable only to the NX45XX, NX65XX, and NX9500, and</td>
</tr>
<tr>
<td></td>
<td>NX9510 series service platforms. It is also available on the Privilege</td>
</tr>
<tr>
<td></td>
<td>Executable Mode of these devices.</td>
</tr>
</tbody>
</table>

on `<DEVICE-NAME>`

Optional. Displays virtual machine history on a specified device. If no device is specified, the system displays information for the logged device.
- `<DEVICE-NAME>` – Specify the name of the service platform.

- `service show wireless [aaa-stats|adaptivity-status|credential-cache|dns-cache|radar-status|vlan-usage] {on `<DEVICE-NAME>`}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show</code></td>
<td>Displays running system statistics based on the parameters passed</td>
</tr>
<tr>
<td><code>wireless</code></td>
<td>Displays WLAN statistics (WLAN AAA policy, configuration parameters, VLAN</td>
</tr>
<tr>
<td></td>
<td>assignment, etc.)</td>
</tr>
<tr>
<td><code>aaa-stats</code></td>
<td>Displays AAA policy statistics</td>
</tr>
<tr>
<td><code>adaptivity-status</code></td>
<td>Displays the current list of channels (with interference levels exceeding</td>
</tr>
<tr>
<td></td>
<td>the configured threshold resulting in adaptivity kicking in) and time when</td>
</tr>
<tr>
<td></td>
<td>adaptivity kicked in on a device</td>
</tr>
<tr>
<td><code>credential-cache</code></td>
<td>Displays clients cached credentials statistics (VLAN, keys, etc.)</td>
</tr>
<tr>
<td><code>dns-cache</code></td>
<td>Displays cache of resolved names of servers related to wireless networking</td>
</tr>
<tr>
<td>radar-status</td>
<td>Displays radar discovery status. This option displays following information:</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• If a radar has been discovered by the AP</td>
</tr>
<tr>
<td></td>
<td>• The time of discovery</td>
</tr>
<tr>
<td>vlan-usage</td>
<td>Displays VLAN statistics across WLANs</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following keywords are common to all of the above:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays running system statistics on a specified</td>
</tr>
<tr>
<td></td>
<td>device. If no device is specified, the system displays information for the logg</td>
</tr>
<tr>
<td></td>
<td>ed device.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service</td>
</tr>
<tr>
<td></td>
<td>platform.</td>
</tr>
</tbody>
</table>

- service show wireless [config-internal|log-internal|neighbors]

| show                     | Displays running system statistics based on the parameters passed            |
|                         | **Note:** This command is not supported on the NX45XX, NX65XX, and NX9000 series |
|                         | service platform.                                                           |
| wireless                 | Displays WLAN statistics (WLAN AAA policy, configuration parameters, VLAN usage, |
|                         | etc.)                                                                       |
| config-internal          | Displays internal configuration parameters                                   |
| log-internal             | Displays recent internal wireless debug logs (info and above severity)       |
| neighbors                | Displays neighboring device statistics for roaming and flow migration       |

- service show wireless [client|meshpoint neighbor] proc [info|stats] {<MAC>} |

| show                     | Displays running system statistics based on the parameters passed            |
| wireless                 | Displays WLAN statistics (WLAN AAA policy, configuration parameters, VLAN usage, |
| client                   | Displays WLAN client statistics                                            |
| meshpoint neighbor        | Displays meshpoint related proc entries                                     |
| proc                     | The following keyword is common to client and meshpoint neighbor parameters: |
|                         | • proc – Displays dataplane proc entries based on the parameter selected      |
|                         | **Note:** These proc entries provide statistics on each wireless client on the WLAN. |
|                         | **Note:** For the meshpoint parameter, it displays proc entries about neighbors. |
| info                     | This parameter is common to client and meshpoint neighbor parameters. Displays |
| stats                    | information for a specified device (wireless client or neighbor) or RF Domain |
| <MAC>                    | Displays information for a specified device (wireless client or neighbor) or RF Domain |
| on <DEVICE-OR-DOMAIN-NAME> | This parameter is common to client and meshpoint neighbor parameters. Displays |
|                         | information for a specified device (wireless client or neighbor) or RF Domain.  |
|                         | • <DEVICE-OR-DOMAIN-NAME> – Specify the name of the AP, wireless controller, |
|                         |   service platform, or RF Domain.                                            |
• service show wireless radio-internal [radio1|radio2] <LINE>

<table>
<thead>
<tr>
<th>show</th>
<th>Displays running system statistics based on the parameters passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>wireless</td>
<td>Displays WLAN statistics (WLAN AAA policy, configuration parameters, VLAN usage, etc.)</td>
</tr>
<tr>
<td>radio-internal</td>
<td>Displays radio internal debug logs. Select the radio from the following options:</td>
</tr>
<tr>
<td>[radio1</td>
<td>radio2]</td>
</tr>
<tr>
<td></td>
<td>• radio2 – Selects radio 2.</td>
</tr>
</tbody>
</table>

Specify the radio internal debug command to enable.

• service show wireless reference [channels|frame|handshake|mcs-rates|reason-codes|status-codes]

<table>
<thead>
<tr>
<th>show</th>
<th>Displays running system statistics based on the parameters passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>wireless</td>
<td>Displays WLAN statistics (WLAN AAA policy, configuration parameters, VLAN usage, etc.)</td>
</tr>
<tr>
<td>reference</td>
<td>Displays look up reference information related to standards, protocols, etc.</td>
</tr>
<tr>
<td>channels</td>
<td>Displays 802.11 channels information</td>
</tr>
<tr>
<td>frame</td>
<td>Displays 802.11 frame structure</td>
</tr>
<tr>
<td>handshake</td>
<td>Displays a flow diagram of 802.11 handshakes</td>
</tr>
<tr>
<td>mcs-rates</td>
<td>Displays MCS rate information</td>
</tr>
<tr>
<td>reason-codes</td>
<td>Displays 802.11 reason codes (for deauthentication, disassociation, etc.)</td>
</tr>
<tr>
<td>status-codes</td>
<td>Displays 802.11 status codes (for association response)</td>
</tr>
</tbody>
</table>

• service show wireless stats-client diag {<MAC/HOSTNAME>} {<on DEVICE-OR-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>show</th>
<th>Displays running system statistics based on the parameters passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>wireless</td>
<td>Displays WLAN statistics (WLAN AAA policy, configuration parameters, VLAN usage, etc.)</td>
</tr>
<tr>
<td>stats-client</td>
<td>Displays managed AP statistics</td>
</tr>
<tr>
<td>&lt;MAC/HOSTNAME&gt;</td>
<td>Optional. Specify the MAC address or hostname of the AP.</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Displays statistics on a specified AP, or all APs on a specified domain.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

• service smart-rf clear-config {<MAC>|<DEVICE-NAME>|on <DOMAIN-NAME>}

<p>| smart-rf | Enables Smart RF management |
| clear-config | Clears WLAN Smart RF configuration on a specified device or on all devices |
| &lt;MAC&gt; | Optional. Clears WLAN Smart RF configuration on a device identified by its MAC address. Specify the device’s MAC address in the AA-BB-CC-DD-EE-FF format. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Clears WLAN Smart RF configuration on a device identified by its hostname. Specify the device’s hostname.</td>
</tr>
<tr>
<td><code>on &lt;DOMAIN-NAME&gt;</code></td>
<td>Optional. Clears WLAN Smart RF configuration on all devices in a specified RF Domain.</td>
</tr>
<tr>
<td>`smart-rf [clear-history</td>
<td>clear-interfering-aps</td>
</tr>
<tr>
<td><code>clear-history</code></td>
<td>Clears WLAN Smart RF history on all devices</td>
</tr>
<tr>
<td><code>clear-interfering-aps</code></td>
<td>Clears Smart-RF interfering APs</td>
</tr>
<tr>
<td><code>save-config</code></td>
<td>Saves the Smart RF configuration on all devices, and also saves the history on the RF Domain Manager</td>
</tr>
<tr>
<td><code>on &lt;DOMAIN-NAME&gt;</code></td>
<td>Optional. Clears WLAN Smart RF configuration on all devices in a specified RF Domain.</td>
</tr>
<tr>
<td><code>snmp sysoid wing5</code></td>
<td>Configures a new sysObjectID (sysoid), in the MIB, for devices running WiNG 5.X devices. When configured, the SNMP manager returns sysoid for WiNG 5.X OS. Hardwares running the WiNG 4.X and WiNG 5.X images have different sysoids. For example, the sysoid for a RFS4000 using the WiNG 4.X image differs from another RFS4000 running the WiNG 5.X image. This command is applicable only to RFS4000, RFS6000, and RFS7000 platforms, since they have the same sysoid supported in WiNG 4.X and WiNG 5.X. The WiNG 4.X sysoids are:</td>
</tr>
<tr>
<td><code>ssm dump-core-snapshot</code></td>
<td>Triggers a debug core dump of the SSM module</td>
</tr>
<tr>
<td>`syslog test {level [&lt;0-7&gt;</td>
<td>alerts</td>
</tr>
</tbody>
</table>
### WiNG 5.8.4 CLI Reference Guide

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>service ssm trace</strong> <strong>pattern</strong> &lt;WORD&gt; <strong>{on</strong> &lt;DEVICE-NAME&gt;&gt;</td>
<td>Displays the SSM module trace based on parameters passed.</td>
</tr>
<tr>
<td><strong>pattern</strong> &lt;WORD&gt;</td>
<td>Configures the pattern to match.</td>
</tr>
<tr>
<td><strong>on</strong> &lt;DEVICE-NAME&gt;</td>
<td>Displays the SSM module trace on a specified device.</td>
</tr>
</tbody>
</table>

#### level
Optional. Sets the logging level. In case syslog server is unreachable, an event is logged based on the logging level defined. This is an optional parameter, and the system configures default settings, if no logging severity level is specified.

- <0-7> – Optional. Specify the logging severity level from 0-7. The various levels and their implications are as follows:
  - alerts – Optional. Immediate action needed (severity=1)
  - critical – Optional. Critical conditions (severity=2)
  - debugging – Optional. Debugging messages (severity=7)
  - emergencies – Optional. System is unusable (severity=0)
  - errors – Optional. Error conditions (severity=3)
  - informational – Optional. Informational messages (severity=6)
  - notifications – Optional. Normal but significant conditions (severity=5)
  - warnings – Optional. Warning conditions (severity=4). This is the default setting.

#### on <DEVICE-NAME>
Optional. Executes the command on a specified device.

- <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

#### service wireless client beacon-request **<MAC>** **mode** [active|passive|table] ssid [SSID|any] channel-report [<CHANNEL-LIST>|none] {on <DEVICE-NAME>}
Sends beacon measurement requests to a wireless client.

- <MAC> Specify the wireless client’s MAC address.
- <SSID> – Requests beacon measurement for a specified SSID
- any – Requests beacon measurement for any SSID
- <CHANNEL-LIST> – Request includes a list of channels. The client has to send beacon measurements only for those channels included in the request
- none – Request applies to all channels

#### channel-report
Configures channel report in the request. The request can include a list of channels or can apply to all channels.
- <CHANNEL-LIST> – Request includes a list of channels. The client has to send beacon measurements only for those channels included in the request
- none – Request applies to all channels

#### on <DEVICE-NAME>
Optional. Sends requests on a specified device.

- <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>service wireless client quiet-element [start</td>
<td>stop]</td>
</tr>
<tr>
<td>service wireless client trigger-bss-transition mac &lt;MAC&gt; {timeout &lt;0-65535&gt; {url &lt;URL&gt;} {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}}</td>
<td>Sends a 80211v-Wireless Network Management BSS transition request to a client. Specifies the wireless client’s MAC address. Specifies the time remaining, for this client, before BSS transition is initiated. In other words on completion of the specified time period, BSS transition is triggered. <code>&lt;0-65535&gt;</code> – Specify a time from 0 -65535 seconds. Optional. Specifies session termination URL. Optional. Sends request on a specified device. <code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
<tr>
<td>service wireless client trigger-wnm mac &lt;MAC&gt; type [deauth-imminent</td>
<td>subscription-remediation] {uri &lt;WORD&gt;}</td>
</tr>
<tr>
<td>service wireless dump-core-snapshot</td>
<td>Triggers a debug core dump of the wireless module</td>
</tr>
<tr>
<td>service wireless meshpoint zl &lt;MESHPOINT-NAME&gt; [on &lt;DEVICE-NAME&gt;] {&lt;ARGS&gt;}</td>
<td>Triggers a zonal level debug of a specified meshpoint’s modules</td>
</tr>
</tbody>
</table>

- **wireless client quiet-element**
  - Enables the quite-element information in beacons sent to wireless clients
- **start**
  - Enables the quite-element information in beacons sent to wireless clients. This is the interval for which all wireless clients are to remain quiet.
- **stop**
  - Disables the quite-element information in beacons sent to wireless clients. Once disabled, this information is no longer included in beacons.
- **wireless client trigger-bss-transition**
  - Sends a 80211v-Wireless Network Management BSS transition request to a client
  - mac <MAC>
    - Specifies the wireless client’s MAC address
  - timeout <0-65535>
    - Specifies the time remaining, for this client, before BSS transition is initiated. In other words on completion of the specified time period, BSS transition is triggered.
    - `<0-65535>` – Specify a time from 0 -65535 seconds.
  - url <URL>
    - Optional. Specifies session termination URL
  - on <DEVICE-OR-DOMAIN-NAME>
    - Optional. Sends request on a specified device
    - `<DEVICE-OR-DOMAIN-NAME>` – Specify the name of the AP, wireless controller, service platform, or RF Domain.
- **wireless client trigger-wnm**
  - Sends a WNM notification (action frame) to a wireless client
  - mac <MAC>
    - Specifies the wireless client’s MAC address
  - type [deauth-imminent|subscription-remediation]
    - Configures the WNM notification type
    - `<deauth-imminent>` – Sends a de-authentication imminent frame
    - `<subscription-remediation>` – Sends a subscription remediation needed frame
  - uri <WORD>
    - Optional. Specifies the `unique resource identifier` (URI)
- **service wireless dump-core-snapshot**
  - Triggers a debug core dump of the wireless module
- **service wireless meshpoint zl <MESHPOINT-NAME> [on <DEVICE-NAME>] \{<ARGS>\}**
  - Triggers a zonal level debug of a specified meshpoint’s modules
  - <MESHPOINT-NAME>
    - Specify the meshpoint name
### on `<DEVICE-NAME>`
Triggers zonal level debug of a specified meshpoint's modules on a specified device
- `<DEVICE-NAME>` – Specify the name of the device (AP, wireless controller, or service platform)

### `<ARGS>`
Optional. Specifies the zonal arguments. These zonal arguments represent the meshpoint modules identified by the zonal and subzonal arguments passed here. Also specify the debug level from 0 - 7. Please see the Examples section, at the end of this topic, for more information.

### timeout `<1-65535>`
Optional. Specifies a timeout value from 1 - 65535 seconds. When specified, meshpoint logs are debugged for the time specified here.

- **service wireless qos delete-tspec `<MAC>` tid `<0-7>`**
  - sends a delete TSPEC request to a wireless client
  - `<MAC>` – Specify the MAC address of the wireless client.
  - `tid `<0-7>` – Deletes the Traffic Identifier (TID)
    - `<0-7>` – Select the TID from 0 - 7.

- **service wireless trace pattern `<WORD>` {on `<DEVICE-NAME>`}
  - displays the wireless module trace based on parameters passed
  - `<WORD>` – Specify the pattern to match.
  - on `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

- **service wireless unsanctioned ap air-terminate `<MAC>` {on `<DOMAIN-NAME>`}
  - enables unsanctioned access points termination
  - `<MAC>` – Configures the unsanctioned access points’ BSSID (MAC address)
  - on `<DOMAIN-NAME>` – Optional. Specifies the RD Domain of the access point
    - `<DOMAIN-NAME>` – Specify the name of the RF Domain.

- **service wireless wips clear-client-blacklist [all|mac `<MAC>`]
  - enables management of WIPS parameters
  - clear-client-blacklist [all|mac `<MAC>`] – Removes a specified client or all clients from the blacklist
    - all – Removes all clients from the blacklist
    - mac `<MAC>` – Removes a specified client form the blacklist
      - `<MAC>` – Specify the wireless client’s MAC address.

- **service wireless wips clear-event-history {on `<DEVICE-OR-DOMAIN-NAME>`
  - enables WIPS management
  - clear-event-history – Clears event history
COMMON COMMANDS 5-35

<table>
<thead>
<tr>
<th>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</th>
<th>Optional. Clears event history on a device or RF Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
<td></td>
</tr>
</tbody>
</table>

**Syntax (Privilege Exec Mode)**

**NOTE:** The “service” command of the Priv Exec Mode is the same as the service command in the User Exec Mode. There are a few modifications that have been documented in this section. For the syntax and parameters of the other commands refer to the (User Exec Mode) syntax and (User Exec Mode) parameters sections of this chapter.

```
service

service [block-adopter-config-updates|clear|cli-tables-skin|cluster|copy|database|
delete|delete-offline-aps|force-send-config|force-update-vm-stats|
guest-registration|load-balancing|locator|mint|pktcap|pm|radio|radius|
request-full-config-from-adopter|restore|set|show|signal|smart-rf|snmp|ssm|
start-shell|syslog|trace|wireless]

service clear crash-info {on <DEVICE-NAME>}

service copy [stats-report|tech-support]
service copy stats-report [global rf-domain <DOMAIN-NAME>] {<FILE>|<URL>}

service database [compact|drop|maintenance-mode|primary-stepdown|remove-all-files|
replica-set|server|start-shell]

service database compact [all|captive-portal|nsight]

service database drop [captive-portal|nsight] collection <COLLECTION-NAME>

service database [maintenance-mode|primary-stepdown|remove-all-files|start-shell]

service database replica-set [add|delete]

service database replica-set add member [<IP>|<FQDN>] [arbiter|priority <0-255>]

service database replica-set delete member [<IP>|<FQDN>]

service database server [restart|start|stop]

service delete sessions <SESSION-COOKIES>

service mint [clear|debug-log|expire] [flood]

service service mint [clear] [lsp-db] [mlcp] [debug-log] [flash-and-syslog] [flash-only]|
expire [lsp|spf] [flood] [csp|lsp]

service pktcap on [bridge|deny|drop|ext-vlan|interface|radio|rim|router|vpn|wireless]

{(acl-name <ACL>, count <1-1000000>, direction [any|inbound|outbound], filter <LINE>,
hex, rate <1-100>, snap <1-2048>, tcpdump, verbose, write [file|url|tzsp [<IP/TZSP- 
HOSTNAME>]])

service pktcap on interface [<INTERFACE-NAME>] [ge <1-4>|me1|port-channel <1-2>|
pppoel|vlan <1-4094]|wwan1] {acl-name <ACL>, count <1-1000000>,
direction [any|inbound|outbound], filter <LINE>, hex, rate <1-100>,
snap <1-2048>, tcpdump, verbose, write [file|url|tzsp [<IP/TZSP-HOSTNAME>]])

service pktcap on radio [<1-1024>|all] {acl-name <ACL>, count <1-1000000>,
direction [any|inbound|outbound], filter <LINE>, hex, promiscuous, rate <1-100>,
snap <1-2048>, tcpdump, verbose, write [file|url|tzsp [<IP/TZSP-HOSTNAME>]])

service pm stop {on <DEVICE-NAME>}

service restore analytics-support [<FILE>|<URL>]

service show last-passwd

service signal [abort <PROCESS-NAME>|kill <PROCESS-NAME>]
```
service start-shell

service trace <PROCESS-NAME> {summary}

Parameters (Privilege Exec Mode)

- service
  - service copy tech-support [<FILE>|<URL>]

<table>
<thead>
<tr>
<th>copy tech-support</th>
<th>Copies extensive system information used for troubleshooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;FILE&gt;</td>
<td>Specify the location to copy file.</td>
</tr>
<tr>
<td></td>
<td>usbX:/path/file</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The number of USB ports available varies with type. For example, RFS6000 has one (1) port, NX4500 has four (4) ports.</td>
</tr>
<tr>
<td>&lt;URL&gt;</td>
<td>Specify the location URL to copy file. Both IPv4 and IPv6 address formats are supported.</td>
</tr>
<tr>
<td></td>
<td>tftp://&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>ftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>sftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
</tbody>
</table>

- service copy stats-report [global|rf-domain <DOMAIN-NAME>] (<FILE>|<URL>)

<table>
<thead>
<tr>
<th>copy stats-report</th>
<th>Copies extensive statistical data useful for troubleshooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>[global]</td>
<td>rf-domain &lt;DOMAIN-NAME&gt;</td>
</tr>
<tr>
<td></td>
<td>• global – Copies extensive statistical data of all configured RF Domains</td>
</tr>
<tr>
<td></td>
<td>• rf-domain &lt;DOMAIN-NAME&gt; – Copies extensive statistical data of a specified RF Domain. Specify the domain name.</td>
</tr>
<tr>
<td>&lt;FILE&gt;</td>
<td>Specify the location to copy file</td>
</tr>
<tr>
<td></td>
<td>usbX:/path/file</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The number of USB ports available varies with device type. For example, RFS6000 has one (1) port, NX4500 has four (4) ports.</td>
</tr>
<tr>
<td>&lt;URL&gt;</td>
<td>Specify the location URL to copy file. Both IPv4 and IPv6 address formats are supported.</td>
</tr>
<tr>
<td></td>
<td>tftp://&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>ftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>sftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
</tbody>
</table>

- service clear crash-info {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>clear crash-info</th>
<th>Clears all crash files</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears crash files on a specified device. These crash files are core, panic, and AP dump.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

- service database compact [all|captive-portal|nsight]

<table>
<thead>
<tr>
<th>database</th>
<th>Performs database (MongoDB) related actions. The database could either be a captive-portal database or NSight database.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Note:</strong> This command is supported only on the NX95XX series and NX9600 service platforms.</td>
</tr>
</tbody>
</table>

Note: This command is supported only on the NX95XX series and NX9600 service platforms.
### common commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>**compact [all</td>
<td>captive-portal</td>
</tr>
</tbody>
</table>
| | • all – Compacts collections within all MongoDB databases (captive-portal and NSight) being maintained  
  • captive-portal – Compacts all collections within the captive portal database only  
  • nsight – Compacts all collections within the NSight database only |
| **database drop [captive-portal| nsight] collection <COLLECTION-NAME>** | Drops the specified collection from the selected database. Select the database type and specify the collection. |
| | • captive-portal – Drops a captive portal database collection  
  • nsight – Drops an NSight database collection |
| **database** | Performs database (MongoDB) related actions. The database could either be a captive-portal database or NSight database. |
| | **Note:** This command is supported only on the NX95XX series and NX9600 service platforms. |
| **drop [captive-portal| nsight] collection <COLLECTION-NAME>** | Drops the specified collection from the selected database. Select the database type and specify the collection. |
| | • captive-portal – Drops a captive portal database collection  
  • nsight – Drops an NSight database collection |
| | The following keyword is common to both the ‘captive-portal’ and ‘NSight’ databases:  
  • collection <COLLECTION-NAME> – Drops the collection identified by the <COLLECTION-NAME> parameter.  
  • <COLLECTION-NAME> – Specify the collection name. |
| **database maintenance-mode** | Places the database server in the maintenance mode |
| **database primary-stepdown** | Requests the primary replica-set to step down. For more information on replica-sets and its creation, see `database-policy`. |
| **database remove-all-files** | Removes all database-server related files (captive-portal and MongoDB). Use in a scenario where complete removal of all database related files is necessary, such as when downgrading to 5.8.1 or 5.8.0 version. Extreme caution is recommended when using this command. |
| **database start-shell** | Starts the MongoDB shell |
| **database replica-set add member [<IP>|<FQDN>] [arbiter|priority <0-255>]** | Adds members in the MongoDB replica set. A replica set in MongoDB is a group of devices running the mongod instances that maintain the same data set. Replica sets provide redundancy and high availability, and are the basis for all production deployments. The replica set can contain a maximum of fifty (50) members, with each member (with the exception of the arbiter) hosts an instance of the MongoDB database. For more information on creating replica sets, see `database-policy`. |
add member [<IP>|<FQDN>]

<table>
<thead>
<tr>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adds members to the MongoDB replica set</td>
<td>Add members to the replica set</td>
</tr>
<tr>
<td><strong>&lt;IP&gt;</strong> – Identifies the member by its IP address. Specify the member’s IP address.</td>
<td>Specify the member’s IP address.</td>
</tr>
<tr>
<td><strong>&lt;FQDN&gt;</strong> – Identifies the member by its Fully Qualified Domain Name (FQDN). Specify the member’s FQDN address.</td>
<td>Specify the member’s FQDN address.</td>
</tr>
</tbody>
</table>

**Note:** Ensure that the identified members have the mongod instance running prior to being added to the replica set. It is recommended to create

[arbiter| priority <0-255>]

<table>
<thead>
<tr>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>After identifying the new member, optionally specify if the member is the arbiter or not. If not the arbiter, specify the member’s priority value.</td>
<td>Specify if the member is the arbiter or not.</td>
</tr>
<tr>
<td><strong>arbiter</strong> – Identifies the new member as the arbiter. The arbiter does not maintain a data set and is added to the replica set to facilitate the election of the fall-back primary member. It provides that one extra vote required in the election of the primary member.</td>
<td>Specify if the new member is the arbiter.</td>
</tr>
<tr>
<td><strong>priority &lt;0-255&gt;</strong> – Identifies the new member as not being the arbiter and configures its priority value.</td>
<td>Specify the priority value from 0 - 255.</td>
</tr>
<tr>
<td><strong>&lt;0-255&gt;</strong> – Specify the priority value from 0 - 255. Not applicable for the arbiter.</td>
<td>Specify the priority value from 0 - 255.</td>
</tr>
</tbody>
</table>

**Note:** All identified members should have the mongod instances running prior to being added to the replica set.

**database**

<table>
<thead>
<tr>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performs database related actions. The database could either be a captive-portal database or NSight database.</td>
<td>Perform database related actions.</td>
</tr>
<tr>
<td><strong>Note:</strong> This command is supported only on the NX95XX series and NX9600 service platforms.</td>
<td>Support only on the NX95XX series and NX9600 service platforms.</td>
</tr>
</tbody>
</table>

**replica-set**

<table>
<thead>
<tr>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allows deletion of members in a MongoDB replica set. For each MongoDB a single three-member replica-set can be created and maintained. For more information on creating replica sets, see database-policy.</td>
<td>Create and maintain a replica set.</td>
</tr>
</tbody>
</table>

**delete member [<IP>|<FQDN>]**

<table>
<thead>
<tr>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deletes members from an existing MongoDB replica set</td>
<td>Delete members from the replica set</td>
</tr>
<tr>
<td><strong>&lt;IP&gt;</strong> – Identifies the member by its IP address. Specify the member’s IP address.</td>
<td>Specify the member’s IP address.</td>
</tr>
<tr>
<td><strong>&lt;FQDN&gt;</strong> – Identifies the member by its FQDN. Specify the member’s FQDN address.</td>
<td>Specify the member’s FQDN address.</td>
</tr>
</tbody>
</table>

**server [restart|start|stop]**

<table>
<thead>
<tr>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performs the following actions on the database server:</td>
<td>Perform actions on the server</td>
</tr>
<tr>
<td><strong>restart</strong> – Reverts the server</td>
<td>Reverts the server</td>
</tr>
<tr>
<td><strong>start</strong> – Starts the server</td>
<td>Starts the server</td>
</tr>
<tr>
<td><strong>stop</strong> – Stops the server</td>
<td>Stops the server</td>
</tr>
</tbody>
</table>
### COMMON COMMANDS 5-39

- **service delete sessions <SESSION-COOKIES>**

  Deletes session cookies
  - `<SESSION-COOKIES>` – Provide a list of cookies to delete.


  mint
  Enables MiNT protocol management (clears LSP database, enables debug logging, enables running silence, etc.)

  clear [lsp-dp|mlcp]
  Clears LSP database and MiNT Link Control Protocol (MLCP) links
  - lsp-dp – Clears MiNT Label Switched Path (LSP) database
  - mlcp – Clears MLCP links

  debug-log [flash-and-syslog|flash-only]
  Enables debug message logging
  - flash-and-syslog – Logs debug messages to the flash and syslog files
  - flash-only – Logs debug messages to the flash file only

  expire [lsp|spf]
  Forces expiration of LSP and recalculation of Shortest Path First (SPF)
  - lsp – Forces expiration of LSP
  - spf – Forces recalculation of SPF

  flood [csnp|lsp]
  Floods control packets
  - csnp – Floods our Complete Sequence Number Packets (CSNP)
  - lsp – Floods our LSP

- **service pm stop {on <DEVICE-NAME>}**

  pm
  Stops the Process Monitor (PM)

  stop
  Stop the PM from monitoring all daemons

  on <DEVICE-NAME>
  Optional. Stops the PM on a specified device
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

- **service pktcap on [bridge|deny|drop|ext-vlan|rim|router|vpn|wireless] {acl-name <ACL>,count <1-1000000>,direction [any|inbound|outbound],filter,hex, rate <1-100>,snap <1-2048>,tcpdump,verbose,write [file|url|tzsp <IP/TZSP-HOSTNAME>]}**

  pktcap on
  Captures data packets crossing at a specified location
  - on – Defines the packet capture location

  bridge
  Captures packets transiting through the Ethernet bridge

  deny
  Captures packets denied by an Access Control List (ACL)

  drop
  Captures packets at the drop locations

  ext-vlan
  Captures packets forwarded to or from an extended VLAN

  rim
  Captures packets at the Radio Interface Module (RIM)

  router
  Captures packets transiting through an IP router

  vpn
  Captures packets forwarded to or from a VPN link

  wireless
  Captures packets forwarded to or from a wireless device
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>acl-name <strong>&lt;ACL&gt;</strong></td>
<td>Optional. Specify the ACL that matches the acl-name for the 'deny' location.</td>
</tr>
<tr>
<td>count <strong>&lt;1-1000000&gt;</strong></td>
<td>Optional. Limits the captured packet count. Specify a value from 1 -1000000.</td>
</tr>
<tr>
<td>direction</td>
<td>Optional. Changes the packet direction with respect to a device. The direction can be set as any, inbound, or outbound.</td>
</tr>
<tr>
<td>filter</td>
<td>Optional. Filters packets based on the option selected (must be used as a last option). The filter options are:</td>
</tr>
<tr>
<td></td>
<td>• <strong>&lt;LINE&gt;</strong> – Defines user defined packet capture filter</td>
</tr>
<tr>
<td></td>
<td>• <strong>arp</strong> – Matches ARP packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>capwap</strong> – Matches CAPWAP packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>cdp</strong> – Matches CDP packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>dot11</strong> – Matches 802.11 packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>dropreason</strong> – Matches packet drop reason</td>
</tr>
<tr>
<td></td>
<td>• <strong>dst</strong> – Matches IP destination</td>
</tr>
<tr>
<td></td>
<td>• <strong>ether</strong> – Matches Ethernet packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>failed</strong> – Matches failed 802.11 transmitted frames</td>
</tr>
<tr>
<td></td>
<td>• <strong>host</strong> – Matches host destination</td>
</tr>
<tr>
<td></td>
<td>• <strong>icmp</strong> – Matches ICMP packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>icmp6</strong> – Matches ICMPv6 frames</td>
</tr>
<tr>
<td></td>
<td>• <strong>ip</strong> – Matches IPV4 packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>ipv6</strong> – Matches IPV6 packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>l2</strong> – Matches L2 header</td>
</tr>
<tr>
<td></td>
<td>• <strong>l3</strong> – Matches L3 header</td>
</tr>
<tr>
<td></td>
<td>• <strong>l4</strong> – Matches L4 header</td>
</tr>
<tr>
<td></td>
<td>• <strong>mint</strong> – Matches MiNT packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>lldp</strong> – Matches LLDP packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>net</strong> – Matches IP in subnet</td>
</tr>
<tr>
<td></td>
<td>• <strong>not</strong> – Filters out any packet that matches the filter criteria (For example, if not TCP is used, all tcp packets are filtered out)</td>
</tr>
<tr>
<td></td>
<td>• <strong>port</strong> – Matches TCP or UDP port</td>
</tr>
<tr>
<td></td>
<td>• <strong>priority</strong> – Matches packet priority</td>
</tr>
<tr>
<td></td>
<td>• <strong>radio</strong> – Matches radio</td>
</tr>
<tr>
<td></td>
<td>• <strong>rssi</strong> – Matches Received Signal Strength Indication (RSSI) of received radio signals</td>
</tr>
<tr>
<td></td>
<td>• <strong>src</strong> – Matches IP source</td>
</tr>
<tr>
<td></td>
<td>• <strong>stp</strong> – Matches STP packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>tcp</strong> – Matches TCP packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>tcp6</strong> – Matches TCP over IPv6 packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>udp</strong> – Matches UDP packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>udp6</strong> – Matches UDP over IPv6 packets</td>
</tr>
<tr>
<td></td>
<td>• <strong>vlan</strong> – Matches VLAN</td>
</tr>
<tr>
<td></td>
<td>• <strong>wlan</strong> – Matches WLAN</td>
</tr>
<tr>
<td>hex</td>
<td>Optional. Provides binary output of the captured packets</td>
</tr>
<tr>
<td>rate <strong>&lt;1-100&gt;</strong></td>
<td>Optional. Specifies the packet capture rate</td>
</tr>
<tr>
<td></td>
<td>• <strong>&lt;1-100&gt;</strong> – Specify a value from 1 - 100 seconds.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>snap &lt;1-2048&gt;</td>
<td>Optional. Captures the data length • &lt;1-2048&gt; – Specify a value from 1 - 2048 characters.</td>
</tr>
<tr>
<td>tcpdump</td>
<td>Optional. Decodes tcpdump. The tcpdump analyzes network behavior, performance, and infrastructure. It also analyzes applications that generate or receive traffic.</td>
</tr>
<tr>
<td>verbose</td>
<td>Optional. Displays full packet body</td>
</tr>
<tr>
<td>write</td>
<td>Captures packets to a specified file. Specify the location to capture file: FILE – flash:/path/file usbX:/path/file vram:startup-config</td>
</tr>
<tr>
<td></td>
<td>Note: The number of USB ports available varies with type. For example, RFS6000 has one (1) port, NX4500 has four (4) ports. URL – Specify the location URL to capture file. Both IPv4 and IPv6 address formats are supported.</td>
</tr>
</tbody>
</table>

- **service pktcap on radio** [<1-1024]|all| ((acl-name <ACL>, count <1-1000000>, direction [any|inbound|outbound], filter <LINE>, hex, promiscuous, rate <1-100>, snap <1-2048>, tcpdump, verbose, write [file|url|tzsp <IP/TZSP-HOSTNAME>])

- **pktcap on radio** Captures data packets on a radio (802.11)
  - <1-1024> Captures data packets on a specified radio • <1-1024> – specify the radio index from 1 - 1024.
  - all Captures data packets on all radios
  - acl-name <ACL> Optional. Specify the ACL that matches the ACL name for the 'deny' location
  - count <1-1000000> Optional. Sets a specified number of packets to capture • <1-1000000> – Specify a value from 1 - 1000000.
  - direction [any|inbound|outbound] Optional. Changes the packet direction with respect to a device. The direction can be set as any, inbound, or outbound.
  - filter <LINE> Optional. Filters packets based on the option selected (must be used as a last option) • <LINE> – Define a packet capture filter or select any one of the available options.
  - hex Optional. Provides binary output of the captured packets
  - rate <1-100> Optional. Specifies the packet capture rate • <1-100> – Specify a value from 1 - 100 seconds.
  - snap <1-2048> Optional. Captures the data length • <1-2048> – Specify a value from 1 - 2048 characters.
  - tcpdump Optional. Decodes the TCP dump
  - verbose Optional. Provides verbose output
write  Captures packets to a specified file. Specify the location to capture file:
   FILE – flash:/path/file
   usbX:/path/file
   nvram:startup-config

Note: The number of USB ports available varies with type. For example, RFS6000 has one (1) port, NX4500 has four (4) ports.
URL – Specify the location URL to capture file. Both IPv4 and IPv6 address formats are supported.
   tftp://<hostname|IPv4/IPv6>[:port]/path/file
   ftp://<user>:<passwd>@<hostname|IPv4/IPv6>[:port]/path/file
   sftp://<user>@<hostname|IPv4/IPv6>[:port]/path/file
   tzsp – The TZSP host. Specify the TZSP host’s IP address or hostname.

| Service pktcap on interface [<INTERFACE>|ge <1-4>|me|port-channel <1-2>|vlan <1-4094>] ([acl-name <ACL>,count <1-1000000>,direction [any|inbound|outbound],filter <LINE>,hex,rate <1-100>,snap <1-2048>,tcpdump,verbose,write [file|url|tzsp <IP/TZSP-HOSTNAME>]]) |Captures data packets at a specified interface
• on – Specify the capture location. |
|---|---|
|interface [<INTERFACE>|ge <1-4>|me1|port-channel <1-2>|vlan <1-4094>] |Captures packets at a specified interface. The options are:
• <INTERFACE> – Specify the interface name.
• ge <1-4> – Selects a GigabitEthernet interface index from 1 - 4
• me1 – Selects the FastEthernet interface
• port-channel <1-2> – Selects a port-channel interface index from 1 - 2
• vlan <1-4094> – Selects a VLAN ID from 1 - 4094 |
|acl-name <ACL> |Optional. Specify the ACL that matches the ACL name for the 'deny' location |
|count <1-1000000> |Optional. Sets a specified number of packets to capture
• <1-1000000> – Specify a value from 1 - 1000000. |
|direction [any|inbound|outbound] |Optional. Changes the packet direction with respect to a device. The direction can be set as any, inbound, or outbound. |
|filter <LINE> |Optional. Filters packets based on the option selected (must be used as a last option)
• <LINE> – Define a packet capture filter or select any one of the available options. |
|hex |Optional. Provides binary output of the captured packets |
|rate <1-100> |Optional. Specifies the packet capture rate
• <1-100> – Specify a value from 1 - 100 seconds. |
|snap <1-2048> |Optional. Captures the data length
• <1-2048> – Specify a value from 1 - 2048 characters. |
|tcpdump |Optional. Decodes the TCP dump |
|verbose |Optional. Provides verbose output |
write | Captures packets to a specified file. Specify the location to capture file:
FILE – flash:/path/file
usbX:/path/file
nvram:startup-config

Note: The number of USB ports available varies with type. For example, RFS6000 has one (1) port, NX4500 has four (4) ports.
URL – Specify the location URL to capture file. Both IPv4 and IPv6 address formats are supported.
  tftp://<hostname|IPv4/IPv6>[:port]/path/file
  ftp://<user>:<passwd>@<hostname|IPv4/IPv6>[:port]/path/file
  sftp://<user>@<hostname|IPv4/IPv6>[:port]/path/file
  tzsp – The TZSP host. Specify the TZSP host’s IP address or hostname.

• service show last-passwd

show | Displays running system statistics based on the parameters passed

last-passwd | Displays the last password used to enter shell

• service signal [abort <PROCESS-NAME> | kill <PROCESS-NAME>]

signal | Sends a signal to a process
  • tech-support – Copies extensive system information useful for troubleshooting

abort | Sends an abort signal to a process, and forces it to dump to core
  • <PROCESS-NAME> – Specify the process name.

kill | Sends a kill signal to a process, and forces it to terminate without a core
  • <PROCESS-NAME> – Specify the process name.

• service start-shell

start-shell | Provides shell access

• service trace <PROCESS-NAME> {summary}

trace | Traces a process for system calls and signals

<PROCESS-NAME> | Specifies the process name

summary | Optional. Generates summary report of the specified process

Syntax (Privilege Exec Mode: NX9000, NX9500, and NX9510)

 service

The following service commands are specific to the NX9000, NX9500, and NX9510 series service platforms:

service copy analytics-support [<FILE>|<URL>]

Parameters (Privilege Exec Mode: NX9000, NX9500, and NX9510)

• service copy analytics-support [<FILE>|<URL>]

copy analytics-support | Enables copying of analytics information to a specified. Use one of the following options to specify the file:
  Note: This information is useful to troubleshoot issues by the Technical Support team.
Usage Guidelines
The NX9500 and NX9510 model service platforms (NOC) provide granular and robust analytic reporting for a RFS4000, RFS6000, RFS7000, NX45XX, or NX65XX device managed network. The data analyzed is collected at intervals specified by the administrator.

To enable data analytics, procure and apply a separate hot spare analytics license at the NOC. The license restricts the number of access point streams processed at the NOC or forwarded to partner systems for further processing. The analytics feature can be turned on at select APs by enabling them in configuration. This way the customer can enable analytics on a select set of APs and not the entire system as long as the number of APs on which it is enabled is less than or equal to the total number of AP analytics licenses available at the NOC controller.

In an NOC managed network, the analytics engine parses and processes Smart RF events as they are received. The analytics engine parses the new channel and power information from the Smart RF event, as opposed to retrieving the event from the devices themselves.

Syntax (Global Config Mode)

```
! service
service [set | show cli]
```

```
service set [command-history <10-300>|upgrade-history <10-100>|reboot-history <10-100>|virtual-machine-history <10-200>] {on <DEVICE-NAME>}
```

```
service show cli
```

Parameters (Global Config Mode)

- `service set [command-history <10-300>|upgrade-history <10-100>|reboot-history <10-100>|virtual-machine-history <10-200>] {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>set</th>
<th>Sets the size of history files</th>
</tr>
</thead>
<tbody>
<tr>
<td>command-history &lt;10-300&gt;</td>
<td>Sets the size of the command history file</td>
</tr>
<tr>
<td>upgrade-history &lt;10-100&gt;</td>
<td>Sets the size of the upgrade history file</td>
</tr>
<tr>
<td>reboot-history &lt;10-100&gt;</td>
<td>Sets the size of the reboot history file</td>
</tr>
<tr>
<td>virtual-machine-history &lt;10-200&gt;</td>
<td>Sets the size of the virtual-machine history file</td>
</tr>
</tbody>
</table>

Note: This command is applicable only to the NX45XX, NX65XX, NX9500, and NX9510 series service platforms. Use the `no > service > set > virtual-machine-history > {on <DEVICE-NAME>} command to revert the history file size to 100.

```
on <DEVICE-NAME> Optional. Sets the size of history files on a specified device
```

- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

### Parameters

- `<FILE>` Specify the file name and location using one of the following formats:
  - `usb1:/path/file`
  - `usb2:/path/file`

- `<URL>` Specify the location URL to copy file. Both IPv4 and IPv6 formats are supported.
  - `ftp://<hostname|IPv4/IPv6>[:port]/path/file`
  - `ftps://<hostname|IPv4/IPv6>[:port]/path/file`
  - `ftp://<user>:<password>@<hostname|IPv4/IPv6>[:port]/path/file`
  - `sftp://<user>:<password>@<hostname|IPv4/IPv6>[:port]/path/file`
• service show cli

show cli Displays running system configuration details
  • cli – Displays the CLI tree of the current mode

Examples

rfs7000-37FABE>service cli-tables-skin stars
rfs7000-37FABE>service show cli
Command mode: +do
  +help [help]
  +search
    +-WORD [help search WORD([detailed|only-show|skip-show|skip-no])
    +-detailed [help search WORD([detailed|only-show|skip-show|skip-no])
    +-only-show [help search WORD([detailed|only-show|skip-show|skip-no])
    +-skip-show [help search WORD([detailed|only-show|skip-show|skip-no])
    +-skip-no [help search WORD([detailed|only-show|skip-show|skip-no])

  +-show
    +-commands [show commands]
    +-adoption
      +-adoptee [show adoption log adoptee([on DEVICE-NAME])]
      +-on
      ```
      +DEVICE-NAME [show adoption log adoptee([on DEVICE-NAME])]
      ```
    +-log
    ```
    +-show
    ```
    +-commands [show commands]
    +-adoption
      ```
      +-adoptee [show adoption log adoptee([on DEVICE-NAME])]
      +on
    ```
    +-log
    ```
    +-adoptee [show adoption log adoptee([on DEVICE-NAME])]
    ```
    +on
    ```
    +-DEVICE-NAME [show adoption log adopter ([mac AA-BB-CC-DD-EE-FF]) ([on DEVICE-NAME])]
    +mac
    ```
    +-DEVICE-NAME [show adoption log adopter ([mac AA-BB-CC-DD-EE-FF]) ([on DEVICE-NAME])]
    +on
    ```
    --More--
    rfs7000-37FABE>

rfs7000-37FABE#service signal abort testprocess
Sending an abort signal to testprocess
rfs7000-37FABE#

rfs7000-37FABE#service pm stop
rfs7000-37FABE#

rfs7000-37FABE(config)#service show cli
Global configuration mode:
  +help [help]
  +search
    +-WORD [help search WORD([detailed|only-show|skip-show|skip-no])
    +-detailed [help search WORD([detailed|only-show|skip-show|skip-no])
    +-only-show [help search WORD([detailed|only-show|skip-show|skip-no])
    +-skip-show [help search WORD([detailed|only-show|skip-show|skip-no])
    +-skip-no [help search WORD([detailed|only-show|skip-show|skip-no])

  +-show
    +-commands [show commands]
    +-adoption
      +-adoptee [show adoption log adoptee([on DEVICE-NAME])]
      +on
    +-log
    ```
    +-show
    ```
    +-commands [show commands]
    +-adoption
      ```
      +-adoptee [show adoption log adoptee([on DEVICE-NAME])]
      +on
    ```
    +-log
    ```
    +-adoptee [show adoption log adoptee([on DEVICE-NAME])]
    ```
    +on
    ```
    +-DEVICE-NAME [show adoption log adopter ([mac AA-BB-CC-DD-EE-FF]) ([on DEVICE-NAME])]
    +mac
    ```
    +-DEVICE-NAME [show adoption log adopter ([mac AA-BB-CC-DD-EE-FF]) ([on DEVICE-NAME])]
    +on
    ```
    --More--
    rfs7000-37FABE(config)#

nx9500-6C8809#service show crash-info
```
CRASH FILE SIZE LAST MODIFIED
--------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>cfgd.log_NX9500_5.8.4.0-024D.error.1</td>
<td>8369</td>
<td>Tue Jun 14 03:54:54 2016</td>
</tr>
</tbody>
</table>
--------------------------------------------------------------------------------
```
nx9500-6C8809#
rfs4000-229D58>service show command-history
Configured size of command history is 200

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>User</th>
<th>Location</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 18 16:04:46</td>
<td>admin</td>
<td>192.168.100.203</td>
<td>40</td>
</tr>
<tr>
<td>Dec 24 15:51:25</td>
<td>admin</td>
<td>192.168.100.169</td>
<td>reload force</td>
</tr>
<tr>
<td>Dec 24 15:51:24</td>
<td>admin</td>
<td>192.168.100.169</td>
<td>write memory</td>
</tr>
<tr>
<td>Dec 14 19:45:18</td>
<td>admin</td>
<td>192.168.100.203</td>
<td>self</td>
</tr>
<tr>
<td>Dec 07 15:54:28</td>
<td>admin</td>
<td>192.168.100.184</td>
<td>reload force</td>
</tr>
<tr>
<td>Dec 07 15:54:27</td>
<td>admin</td>
<td>192.168.100.184</td>
<td>write memory</td>
</tr>
<tr>
<td>Nov 30 16:38:55</td>
<td>admin</td>
<td>192.168.100.126</td>
<td>revert</td>
</tr>
<tr>
<td>Nov 30 16:27:28</td>
<td>admin</td>
<td>192.168.100.126</td>
<td>rf-domain test</td>
</tr>
<tr>
<td>Nov 19 15:29:34</td>
<td>admin</td>
<td>192.168.100.202</td>
<td>15</td>
</tr>
<tr>
<td>Nov 12 16:27:28</td>
<td>admin</td>
<td>192.168.100.205</td>
<td>reload force</td>
</tr>
<tr>
<td>Nov 12 16:27:06</td>
<td>admin</td>
<td>192.168.100.205</td>
<td>boot system primary</td>
</tr>
<tr>
<td>Nov 12 15:52:55</td>
<td>admin</td>
<td>192.168.100.205</td>
<td>7</td>
</tr>
<tr>
<td>Nov 12 15:58:37</td>
<td>admin</td>
<td>192.168.100.205</td>
<td>reload force</td>
</tr>
</tbody>
</table>

--More--
rfs4000-229D58>

rfs7000-37FABE>service show diag stats

fan 1 current speed: 6660 min_speed: 2000 hysterisis: 250
fan 2 current speed: 6720 min_speed: 2000 hysterisis: 250
fan 3 current speed: 6540 min_speed: 2000 hysterisis: 250

Sensor 1 Temperature 32.0 C
Sensor 2 Temperature 58.0 C
Sensor 3 Temperature 29.0 C
Sensor 4 Temperature 28.0 C
Sensor 5 Temperature 26.0 C
Sensor 6 Temperature 28.0 C

rfs7000-37FABE>

rfs7000-37FABE>service show info
7.8M out of 8.0M available for logs.
33.0M out of 34.0M available for history.
63.9M out of 84.0M available for crashinfo.

List of Files:

adopts.log 3.5K  Jan 18 16:07
anald.log  1.2K  Jan 18 16:07
cfgd.log  37.9K  Jan 27 15:14
dpd2.log  97.7K  Jan 27 15:06
messages.log  0    Jan 18 16:06
startup.log  8.3K  Jan 18 16:07
upgrade.log  2.9K  Jan 18 16:09
vlan-usage.log  0    Jan 27 14:59
command.history  3.3K  Jan 18 16:04
reboot.history  3.1K  Jan 18 16:05
upgrade.history  1.6K  Jan 18 16:04

Please export these files or delete them for more space.

rfs7000-37FABE>

nx9500-6C8809>service show mac-vendor B4-C7-99-6C-88-09
B4-C7-99 : Zebra Tech

nx9500-6C8809>
nx9500-6C8809>service show upgrade-history
Configured size of upgrade history is 50

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Old Version</th>
<th>New Version</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun 22 02:06:37 2016</td>
<td>5.8.4.0-025D</td>
<td>5.8.4.0-026D</td>
<td>Successful</td>
</tr>
<tr>
<td>Jun 18 05:38:46 2016</td>
<td>5.8.4.0-024D</td>
<td>5.8.4.0-025D</td>
<td>Successful</td>
</tr>
<tr>
<td>Jun 14 03:49:01 2016</td>
<td>5.8.4.0-022D</td>
<td>5.8.4.0-024D</td>
<td>Successful</td>
</tr>
<tr>
<td>Jun 08 22:32:10 2016</td>
<td>5.8.4.0-018D</td>
<td>5.8.4.0-022D</td>
<td>Successful</td>
</tr>
<tr>
<td>Jun 01 03:32:44 2016</td>
<td>5.8.4.0-017D</td>
<td>5.8.4.0-018D</td>
<td>Successful</td>
</tr>
<tr>
<td>May 27 18:53:37 2016</td>
<td>5.8.4.0-016D</td>
<td>5.8.4.0-017D</td>
<td>Successful</td>
</tr>
<tr>
<td>May 24 17:51:37 2016</td>
<td>5.8.4.0-015D</td>
<td>5.8.4.0-016D</td>
<td>Successful</td>
</tr>
<tr>
<td>May 20 18:05:20 2016</td>
<td>5.8.4.0-014D</td>
<td>5.8.4.0-015D</td>
<td>Successful</td>
</tr>
<tr>
<td>May 17 11:33:29 2016</td>
<td>5.8.4.0-012D</td>
<td>5.8.4.0-014D</td>
<td>Successful</td>
</tr>
<tr>
<td>May 13 12:23:29 2016</td>
<td>5.8.4.0-011D</td>
<td>5.8.4.0-012D</td>
<td>Successful</td>
</tr>
<tr>
<td>May 09 13:57:17 2016</td>
<td>5.8.4.0-009D</td>
<td>5.8.4.0-011D</td>
<td>Successful</td>
</tr>
<tr>
<td>May 04 10:42:48 2016</td>
<td>5.8.4.0-008D</td>
<td>5.8.4.0-009D</td>
<td>Successful</td>
</tr>
<tr>
<td>Apr 29 11:55:46 2016</td>
<td>5.8.4.0-007D</td>
<td>5.8.4.0-008D</td>
<td>Successful</td>
</tr>
</tbody>
</table>
--More--

rfs7000-37FABE#service show wireless reference reason-codes

<table>
<thead>
<tr>
<th>CODE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Success</td>
</tr>
<tr>
<td>1</td>
<td>Unspecified Reason</td>
</tr>
<tr>
<td>2</td>
<td>Previous authentication no longer valid</td>
</tr>
<tr>
<td>3</td>
<td>Deauth because sending STA is leaving IBSS or ESS</td>
</tr>
<tr>
<td>4</td>
<td>Disassoc due to inactivity</td>
</tr>
<tr>
<td>5</td>
<td>Disassoc because AP is unable to handle all currently assoc STA</td>
</tr>
<tr>
<td>6</td>
<td>Class 2 frame received from non-authenticated STA</td>
</tr>
<tr>
<td>7</td>
<td>Class 3 frame received from nonassociated STA</td>
</tr>
</tbody>
</table>
--More--
rfs7000-37FABE#

rfs7000-37FABE#service show wireless reference status-codes

<table>
<thead>
<tr>
<th>CODE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Successful</td>
</tr>
<tr>
<td>1</td>
<td>Unspecified failure</td>
</tr>
<tr>
<td>2-9</td>
<td>Reserved</td>
</tr>
<tr>
<td>10</td>
<td>Cannot support all requested capabilities in the Capability Information field</td>
</tr>
<tr>
<td>11</td>
<td>Reassociation denied due to inability to confirm that association exists</td>
</tr>
<tr>
<td>12</td>
<td>Association denied due to reason outside the scope of this standard</td>
</tr>
<tr>
<td>13</td>
<td>Responding STA does not support the specified authentication algorithm</td>
</tr>
<tr>
<td>14</td>
<td>Received an auth frame with authentication transaction seq number out of expected sequence</td>
</tr>
<tr>
<td>15</td>
<td>Authentication rejected because of challenge failure</td>
</tr>
</tbody>
</table>
--More--
rfs7000-37FABE#

rfs4000-229D58>service show xpath-history

<table>
<thead>
<tr>
<th>DATE&amp;TIME</th>
<th>USER</th>
<th>XPATH</th>
<th>DURATION(MS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wed Jan 27 15:14:49 2016</td>
<td>system</td>
<td>wing-stats/device/00-23-68-88-0D-A7/service-info</td>
<td>158</td>
</tr>
<tr>
<td>Wed Jan 27 15:12:28 2016</td>
<td>system</td>
<td>wing-stats/device/00-23-68-88-0D-A7/command-history</td>
<td>14</td>
</tr>
<tr>
<td>Mon Jan 18 19:40:39 2016</td>
<td>system</td>
<td>wing-stats/device/00-23-68-88-0D-A7/system</td>
<td>371</td>
</tr>
</tbody>
</table>
--More--
rfs4000-229D58>
rfs7000-37FABE>service show wireless config-internal
! Startup-Config-Playback Completed: Yes
no debug wireless
no country-code
rfs7000-37FABE>
The following example shows the `service > show > virtual-machine-history` output on a NX4500 service platform:

```
nx4500-5CFA2B>service show virtual-machine-history
Configured size of virtual machine history is 100

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Virtual Machine</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun 01 08:54:21 2015</td>
<td>team-urc</td>
<td>autostart</td>
</tr>
<tr>
<td>Jun 01 08:52:54 2015</td>
<td>team-urc</td>
<td>stop (WiNG shutdown)</td>
</tr>
<tr>
<td>May 26 08:25:25 2015</td>
<td>team-urc</td>
<td>autostart</td>
</tr>
<tr>
<td>May 26 08:23:54 2015</td>
<td>team-urc</td>
<td>stop (WiNG shutdown)</td>
</tr>
<tr>
<td>May 18 08:31:31 2015</td>
<td>team-urc</td>
<td>autostart</td>
</tr>
<tr>
<td>May 18 08:30:03 2015</td>
<td>team-urc</td>
<td>stop (WiNG shutdown)</td>
</tr>
<tr>
<td>May 18 08:29:58 2015</td>
<td>team-urc</td>
<td>stop (WiNG shutdown)</td>
</tr>
<tr>
<td>May 11 08:25:16 2015</td>
<td>team-urc</td>
<td>autostart</td>
</tr>
<tr>
<td>May 11 08:23:47 2015</td>
<td>team-urc</td>
<td>stop (WiNG shutdown)</td>
</tr>
</tbody>
</table>
```

```
nx4500-5CFA2B>
nx4500-5CFA2B>service clear virtual-machine-history
```

```
nx4500-5CFA2B>service show virtual-machine-history
Configured size of virtual machine history is 100
No entries in virtual machine history
```

The following example shows the `service > show > virtual-machine-history` output on a NX9500 service platform:

```
nx9500-6C874D>service show virtual-machine-history
Configured size of virtual machine history is 100

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Virtual Machine</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 10 05:39:46 2016</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Nov 16 03:47:09 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Nov 02 05:53:48 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Oct 27 10:52:59 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Oct 14 05:56:14 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Oct 14 03:01:48 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Oct 12 04:11:52 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Oct 09 07:19:19 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Oct 09 06:48:51 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Oct 06 04:40:59 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Oct 06 04:24:46 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Oct 05 10:14:22 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Sep 30 04:41:08 2015</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
</tbody>
</table>
```

```
nx9500-6C874D>
```
The following example displays the site configuration on a NOC controller:

nx9500-6C8809>service show sites
-- Site [B4-C7-99-5C-FA-8E] --
[B4-C7-99-5C-FA-8E] - Controller, Adopted
Cfg Status: configured
[00-23-68-11-E6-C4] - AP
[B4-C7-99-74-B4-5C] - AP
-- Site [B4-C7-99-6D-B5-D4] --
[B4-C7-99-6D-B5-D4] - Controller, Adopted
Cfg Status: configured
-- Site [TechPubsLan] --
[B4-C7-99-6D-CD-4B] - Controller, Adopted, Master
Cfg Status: configured
-- Site [B4-C7-99-6C-88-09] --
[B4-C7-99-6C-88-09] - Controller, Adopted
Cfg Status: configured
[B4-C7-99-6D-CD-4B] - Controller, Adopted
Cfg Status: configured
[B4-C7-99-6D-B5-D4] - Controller, Adopted
Cfg Status: configured

rfs7000-6DCD4B>service show sites
-- Site [B4-C7-99-6D-CD-4B] --
[B4-C7-99-74-B4-5C] - AP
[00-23-68-11-E6-C4] - AP
-- Site [00-15-70-7A-74-2D] --
[B4-C7-99-71-17-28] - AP
[00-15-70-81-74-2D] - Controller, Adopted
Cfg Status: version-mismatch
rfs7000-6DCD4B>

rfs4000-229D58#service show fib6
--------------------------------------------------------------------------------
Route Table ID : 254
::1/128
Next Hop: :: Interface: lo Route Type: ROUTE_TYPE_CONNECT
Route Status: ROUTE_STATUS_KERNEL Metric: 0 Distance: 0
fe80::/64
Next Hop: :: Interface: vlan2 Route Type: ROUTE_TYPE_CONNECT
Route Status: ROUTE_STATUS_KERNEL Metric: 256 Distance: 0
2001::/64
Next Hop: 2001::6 Interface: Route Type: ROUTE_TYPE_STATIC
Route Status: ROUTE_STATUS_PENDING Metric: 256 Distance: 1
rfs4000-229D58#
Examples for the service > wireless > meshpoint command.

The following example displays meshpoint modules:

```
ROOT1-ap81xx-71174C#service wireless meshpoint zl mesh_root on ROOT1-ap81xx-71174C
```

<table>
<thead>
<tr>
<th>ZONE</th>
<th>GEN</th>
<th>TX</th>
<th>RX</th>
<th>BEA</th>
<th>TXF</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-LLC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3-ND</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>NBR</td>
<td>LQM</td>
</tr>
<tr>
<td>4-ORL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>HEL</td>
<td>PRO</td>
</tr>
<tr>
<td>5-LQ</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>HEL</td>
<td>PRO</td>
</tr>
<tr>
<td>6-PS</td>
<td>0</td>
<td></td>
<td></td>
<td>GEN</td>
<td></td>
</tr>
<tr>
<td>7-RS</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>REC</td>
<td></td>
</tr>
<tr>
<td>8-IA</td>
<td>0</td>
<td></td>
<td></td>
<td>GEN</td>
<td></td>
</tr>
<tr>
<td>11-MGT</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>SET</td>
<td>GET</td>
</tr>
<tr>
<td>13-LSA</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14-ACS</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>SCAN</td>
<td>TRIG</td>
</tr>
<tr>
<td>15-EAP</td>
<td>0</td>
<td></td>
<td></td>
<td>GEN</td>
<td></td>
</tr>
<tr>
<td>16-L2P</td>
<td>0</td>
<td></td>
<td></td>
<td>GEN</td>
<td></td>
</tr>
</tbody>
</table>

In the preceding example,
- The meshpoint name is **mesh_root**
- The device on which the command is executed is **ROOT1-ap81xx-71174C**
- The vertical **ZONE** column represents meshpoint modules. For example, **3-ND** presents the Neighbor Discovery module.
- The **SUBZONE** 0 to 7 represents the available processes for each of the zonal modules.
- Debugging is disabled for all modules for the mesh-root meshpoint. A value of 0 (Zero) represents debugging disabled.

To enable meshpoint module debugging, specify the module number and the process number separated by a period (.). And then specify the debugging level from 0 - 7.

```
ROOT1-ap81xx-71174C#service wireless meshpoint zl mesh_root on ROOT1-ap81xx-71174C 3.2.7
```

In the preceding command,
- The meshpoint module number provided is **3** (ND)
- The process number provided is **2** (RX - Received signals from neighbors)
- The debugging level provided is **7** (highest level - warning)
In the preceding example, level 7 debugging has been enabled only for the ND module’s received signals. Note that debugging for all other modules and processes are still disabled.

To disable debugging for all modules, specify 0 (zero) in the command. For example:

```
ROOT1-ap81xx-71174C#service wireless meshpoint zl mesh_root on ROOT1-ap81xx-71174C 0
```

To enable debugging for all modules, specify the debugging level number. For example:

```
ROOT1-ap81xx-71174C#service wireless meshpoint zl mesh_root on ROOT1-ap81xx-71174C 5
```
The following examples show the purging of users from the guest-registration database:

nx7500-112233#service guest-registration delete ?
   all                     Delete all users
   email                  Email address
   group                  Group
   mac                    MAC address
   mobile                 Mobile phone number
   name                   Full name
   offline-for            Specify minimum amount of time offline
   otp-incomplete-for     Specify minimum amount of time registration with
                           one-time-passcode incomplete
   social                 Social site used to log in
   wlan                   Wireless LAN

nx7500-112233#

1. Purges users belonging to a specified RADIUS group.

nx7500-112233#service guest-registration delete group mac_reg_gr1
delete user status: delete users matching a group will take time, please wait
nx7500-112233#

2. Purges users using social-site (Facebook or Google) credentials to login.

nx7500-112233#service guest-registration delete social facebook
delete user status: deleting a social category will take time, please wait
nx7500-112233#

3. Purges users inactive for a specified time period.

nx7500-112233#service guest-registration delete offline-for days 5
delete user status: Deleting users offline for minimum 5 days. This will take time,
please wait
nx7500-112233#

4. Purges users who have failed to complete registration using the one-time-passcode (OTP) within a specified time period.

nx7500-112233#service guest-registration delete otp-incomplete-for days 5
delete user status: Deleting registration with one-time-passcode incomplete for
minimum 5 days. This will take time, please wait
nx7500-112233#
5.1.8 show

Common Commands

Displays specified system component settings. There are a number of ways to invoke the show command:

- When invoked without any arguments, it displays information about the current context. If the current context contains instances, the show command (usually) displays a list of these instances.
- When invoked with the display parameter, it displays information about that component.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show <PARAMETERS>

Parameters

- show <PARAMETERS>

The show command displays configuration details based on the configuration mode, in which the command is executed, and the parameters passed. For example, when executed in the AAA policy configuration mode, it displays the logged AAA policy’s current settings. The example below shows the configuration details that can be viewed in the Priv Executable mode.

Examples

```
rfs7000-37FABE#show ?
 adoption  Adoption related information
 bluetooth  Bluetooth Configuration/Statistics commands
 bonjour    Bonjour Gateway related commands
 boot       Display boot configuration.
 captive-portal  Captive portal commands
 captive-portal-page-upload  Captive portal advanced page upload
 cdp        Cisco Discovery Protocol
 classify-url  Query the category of an URL
 clock      Display system clock
 cluster    Cluster Protocol
 cmp-factory-certs  Display the CMP certificate status
 commands   Show command lists
 context    Information about current context
 critical-resources  Critical Resources
 crypto     Encryption related commands
 debug      Debugging functions
 debugging  Debugging functions
 device-upgrade  Device Upgrade
 dot1x      802.1X
 dpi        Deep Packet Inspection
 environmental-sensor  Display Environmental Sensor Module status
 event-history  Display event history
 event-system-policy  Display event system policy
 ex3500     EX3500 device details
 extdev     External device (T5, Ex3500..)
 file       Display filesystem information
 file-sync  File sync between controller and adoptees
 firewall   Wireless Firewall
 global     Global-level information
 gre        Show gre tunnel info
 interface  Interface Configuration/Statistics commands
 ip         Internet Protocol (IP)
 ip-access-list  IP ACL
```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipv6</td>
<td>Internet Protocol version 6 (IPv6)</td>
</tr>
<tr>
<td>ipv6-access-list</td>
<td>IPv6 ACL</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>L2TPv3 information</td>
</tr>
<tr>
<td>ldap-agent</td>
<td>LDAP Agent Configuration</td>
</tr>
<tr>
<td>licenses</td>
<td>Show installed licenses and usage</td>
</tr>
<tr>
<td>lldp</td>
<td>Link Layer Discovery Protocol</td>
</tr>
<tr>
<td>logging</td>
<td>Show logging information</td>
</tr>
<tr>
<td>mac-access-list</td>
<td>MAC Access list</td>
</tr>
<tr>
<td>mac-address-table</td>
<td>Display MAC address table</td>
</tr>
<tr>
<td>mac-auth</td>
<td>MAC authentication</td>
</tr>
<tr>
<td>mac-auth-clients</td>
<td>MAC authenticated clients</td>
</tr>
<tr>
<td>mint</td>
<td>MiNT protocol</td>
</tr>
<tr>
<td>ntp</td>
<td>Network time protocol</td>
</tr>
<tr>
<td>password-encryption</td>
<td>Password encryption</td>
</tr>
<tr>
<td>pppoe-client</td>
<td>PPP Over Ethernet client</td>
</tr>
<tr>
<td>privilege</td>
<td>Show current privilege level</td>
</tr>
<tr>
<td>radius</td>
<td>RADIUS statistics commands</td>
</tr>
<tr>
<td>reload</td>
<td>Scheduled reload information</td>
</tr>
<tr>
<td>remote-debug</td>
<td>Show details of remote debug sessions</td>
</tr>
<tr>
<td>rf-domain-manager</td>
<td>Show RF Domain Manager selection details</td>
</tr>
<tr>
<td>role</td>
<td>Role based firewall</td>
</tr>
<tr>
<td>route-maps</td>
<td>Display Route Map Statistics</td>
</tr>
<tr>
<td>rts</td>
<td>RTLS Statistics</td>
</tr>
<tr>
<td>running-config</td>
<td>Current operating configuration</td>
</tr>
<tr>
<td>session-changes</td>
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<tr>
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<td>Display CLI sessions</td>
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<tr>
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<tr>
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</table>

**NOTE:** For more information on the show command, see Chapter 6, SHOW COMMANDS.
5.1.9 write

Common Commands

Writes the system running configuration to memory or terminal

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
write [memory|terminal]

Parameters
- write [memory|terminal]

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<tr>
<th>memory</th>
<th>Writes to the non-volatile (NV) memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>terminal</td>
<td>Writes to the terminal</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE>write memory
[OK]
rfs7000-37FABE>
Show commands display configuration settings or statistical information. Use this command to view the current running configuration as well as the start-up configuration. The show command also displays the current context’s configuration.

This chapter describes the ‘show’ CLI commands used in the USER EXEC, PRIV EXEC, and GLOBAL CONFIG modes. Commands entered in either USER EXEC mode or PRIV EXEC mode are referred to as EXEC mode commands. If a user or privilege is not specified, the referenced command can be entered in either mode.

This chapter also describes the ‘show’ commands in the ‘GLOBAL CONFIG’ mode. The commands can be entered in all three modes, except commands like file, IP access list statistics, MAC access list statistics, and upgrade statistics, which cannot be entered in the USER EXEC mode.

---

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore `_` character. In other words, the name of a device cannot contain an underscore.
6.1 show commands

The following table summarizes show commands:

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<td>commands</td>
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<td>Displays information about the current context</td>
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<td>Displays database-related statistics and status</td>
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<td>Displays device firmware upgradation information for devices adopted by a wireless controller or access point</td>
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### Table 6.1 Show Commands

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<td>Displays wireless firewall information</td>
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<td>Displays IPv6 access list statistics</td>
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<td>l2tpv3</td>
<td>Displays Layer 2 Tunnel Protocol Version 3 (L2TPV3) information</td>
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<td>ldap-agent</td>
<td>Displays an LDAP agent’s join status (join status to a LDAP server domain)</td>
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<td>Displays MiNT protocol configuration commands</td>
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<td>ntp</td>
<td>Displays Network Time Protocol (NTP) information</td>
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<td>Displays Point to Point Protocol over Ethernet (PPPoE) client information</td>
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<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
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<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------</td>
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<td>privilege</td>
<td>Displays current privilege level information</td>
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<tr>
<td>radius</td>
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<td>Displays RF Domain manager selection details</td>
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<td>Displays role-based firewall information</td>
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<td>route-maps</td>
<td>Display route map statistics</td>
<td>page 6-120</td>
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<tr>
<td>rls</td>
<td>Displays Real Time Location Service (RTLS) statistics of access points</td>
<td>page 6-121</td>
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<tr>
<td>running-config</td>
<td>Displays configuration file contents</td>
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<tr>
<td>session-changes</td>
<td>Displays configuration changes made in this session</td>
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<tr>
<td>session-config</td>
<td>Displays a list of currently active open sessions on the device</td>
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<tr>
<td>sessions</td>
<td>Displays CLI sessions</td>
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<tr>
<td>site-config-diff</td>
<td>Displays the difference between site configuration available on NOC and the actual site configuration</td>
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<tr>
<td>smart-rf</td>
<td>Displays Smart RF management commands</td>
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<td>spanning-tree</td>
<td>Displays spanning tree information</td>
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<tr>
<td>startup-config</td>
<td>Displays complete startup configuration script on the console</td>
<td>page 6-139</td>
</tr>
<tr>
<td>t5</td>
<td>Displays adopted T5 controller details. This command is applicable only on the RFS4000, RFS6000, RFS7000, NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, and NX9510.</td>
<td>page 6-140</td>
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<td>terminal</td>
<td>Displays terminal configuration parameters</td>
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<tr>
<td>timezone</td>
<td>Displays timezone information for the system and managed devices</td>
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<td>traffic-shape</td>
<td>Displays traffic-shaping related configuration details and statistics</td>
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<td>upgrade-status</td>
<td>Displays image upgrade status</td>
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<tr>
<td>version</td>
<td>Displays a device’s software and hardware version</td>
<td>page 6-153</td>
</tr>
<tr>
<td>vrrp</td>
<td>Displays Virtual Router Redundancy Protocol (VRRP) protocol details</td>
<td>page 6-154</td>
</tr>
<tr>
<td>web-filter</td>
<td>Displays pre-configured, in-built Web filter options available. These options are: category (URL category), category-types, filter-level, etc. This command also displays Web filter statistics and status.</td>
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<tr>
<td>what</td>
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<td>wireless</td>
<td>Displays wireless configuration parameters</td>
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</tr>
<tr>
<td>wwan</td>
<td>Displays the wireless WAN status</td>
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</tr>
<tr>
<td>slot</td>
<td>Displays Peripheral Component Interconnect (PCI) express slot statistics</td>
<td>page 6-183</td>
</tr>
</tbody>
</table>
### Table 6.1 Show Commands

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<th>Command</th>
<th>Description</th>
<th>Reference</th>
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<td><code>smart-cache</code></td>
<td>Displays details on the cached entry for a specific URL or all URLs</td>
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</tr>
<tr>
<td><code>virtual-machine</code></td>
<td>Displays the virtual-machine (VM) configuration, logs, and statistics (applicable only to the NX45XX and NX65XX service platforms)</td>
<td>page 6-186</td>
</tr>
<tr>
<td><code>mirroring</code></td>
<td>Displays the port mirroring sessions (applicable only to the NX4524 and NX6524 service platforms)</td>
<td>page 6-189</td>
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<tr>
<td><code>raid</code></td>
<td>Displays Redundant Array of Independent Disks (RAID) related information, such as array status, consistency check status, and RAID log.</td>
<td>page 6-190</td>
</tr>
</tbody>
</table>
6.1.1 show

show commands

The show command displays following information:

- A device’s current configuration
- A device’s start-up configuration
- A device’s current context configuration, such as profiles and policies

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX5600, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9510, NX9600

Syntax

show <PARAMETERS>

Parameters

- show <PARAMETERS>

The show command displays configuration details based on the configuration mode, in which the command is executed, and the parameters passed. For example, when executed in the AAA policy configuration mode, it displays the logged AAA policy’s current settings. The examples below show the configuration parameters that can be viewed in the User Executable, Priv Executable, and Global Configurable modes.

Examples

The following examples list the show commands in the User Exec, Priv Exec, and Global Config modes:

GLOBAL CONFIG Mode

<DEVICE>(config)#show ?

adoption Adoption related information
bluetooth Bluetooth Configuration/Statistics commands
bonjour Bonjour Gateway related commands
boot Display boot configuration.
captive-portal Captive portal commands
captive-portal-page-upload Captive portal advanced page upload
cdp Cisco Discovery Protocol
classify-url Query the category of an URL
clock Display system clock
cluster Cluster Protocol
cmp-factory-certs Display the CMP certificate status
commands Show command lists
context Information about current context
critical-resources Critical Resources
crypto Encryption related commands
database Database
debug Debugging functions
debugging Debugging functions
device-upgrade Device Upgrade
dot1x 802.1X
dpi Deep Packet Inspection
environmental-sensor Display Environmental Sensor Module status
event-history Display event history
event-system-policy Display event system policy
ex3500 EX3500 device details
extdev External device (T5, EX3500..)
file Display filesystem information
file-sync File sync between controller and adoptees
firewall Wireless Firewall
SHOW COMMANDS 6-7

- **global**
  - Global-level information

- **gre**
  - Displays gre related information

- **guest-registration**
  - Guest registration commands

- **interface**
  - Interface Configuration/Statistics commands

- **ip**
  - Internet Protocol (IP)

- **ip-access-list**
  - IP ACL

- **ipv6**
  - Internet Protocol version 6 (IPv6)

- **ipv6-access-list**
  - IPv6 ACL

- **l2tpv3**
  - L2TPv3 information

- **ldap-agent**
  - LDAP Agent Configuration

- **licenses**
  - Show installed licenses and usage

- **lldp**
  - Link Layer Discovery Protocol

- **logging**
  - Show logging information

- **mac-access-list**
  - MAC ACL

- **mac-address-table**
  - Display MAC address table

- **mac-auth**
  - MAC authentication

- **mac-auth-clients**
  - MAC authenticated clients

- **mint**
  - MiNT protocol

- **mirroring**
  - Show mirroring sessions

- **nsight**
  - Nsight Server Module

- **ntp**
  - Network time protocol

- **password-encryption**
  - Password encryption

- **pppoe-client**
  - PPP Over Ethernet client

- **privilege**
  - Show current privilege level

- **radius**
  - RADIUS statistics commands

- **raid**
  - Show RAID status

- **reload**
  - Scheduled reload information

- **remote-debug**
  - Show details of remote debug sessions

- **rf-domain-manager**
  - Show RF Domain Manager selection details

- **role**
  - Role based firewall

- **route-maps**
  - Display Route Map Statistics

- **rtls**
  - RTLS Statistics

- **running-config**
  - Current operating configuration

- **session-changes**
  - Configuration changes made in this session

- **session-config**
  - This session configuration

- **sessions**
  - Display CLI sessions

- **site-config-diff**
  - Difference between site configuration on the NOC and actual site configuration

- **slot**
  - Expansion slots stats

- **smart-cache**
  - Content caching

- **smart-rf**
  - Smart-RF Management Commands

- **spanning-tree**
  - Display spanning tree information

- **startup-config**
  - Startup configuration

- **t5**
  - T5 details

- **terminal**
  - Display terminal configuration parameters

- **timezone**
  - The timezone

- **traffic-shape**
  - Display traffic shaping

- **upgrade-status**
  - Display last image upgrade status

- **version**
  - Display software & hardware version

- **virtual-machine**
  - Virtual Machine

- **vrrp**
  - VRRP protocol

- **web-filter**
  - Web filter

- **what**
  - Perform global search

- **wireless**
  - Wireless commands

- **wwan**
  - Display wireless WAN Status

```
<DEVICE>(config)#
rfs7000-37FABE(config)#show clock
2016-01-27 11:25:57 UTC

rfs7000-37FABE(config)#
```
### PRIVILEGE EXEC Mode

<DEVICE>#show ?

- **adoption** Adoption related information
- **bluetooth** Bluetooth Configuration/Statistics commands
- **boot** Display boot configuration.
- **captive-portal** Captive portal commands
- **captive-portal-page-upload** Captive portal advanced page upload
- **cdp** Cisco Discovery Protocol
- **classify-url** Query the category of an URL
- **clock** Display system clock
- **cluster** Cluster Protocol
- **cmp-factory-certs** Display the CMP certificate status
- **commands** Show command lists
- **context** Information about current context
- **critical-resources** Critical Resources
- **crypto** Encryption related commands
- **database** Database
- **debug** Debugging functions
- **debugging** Debugging functions
- **device-upgrade** Device Upgrade
- **dot1x** 802.1X
- **dpi** Deep Packet Inspection
- **environmental-sensor** Display Environmental Sensor Module status
- **event-history** Display event history
- **event-system-policy** Display event system policy
- **ex3500** EX3500 device details
- **extdev** External device (T5, EX3500..)
- **file** Display filesystem information
- **file-sync** File sync between controller and adoptees
- **firewall** Wireless Firewall
- **global** Global-level information
- **gre** Negate a command or set its defaults
- **guest-registration** Guest registration commands
- **interface** Interface Configuration/Statistics commands
- **ip** Internet Protocol (IP)
- **ip-access-list** IP ACL
- **ipv6** Internet Protocol version 6 (IPv6)
- **ipv6-access-list** IPv6 ACL
- **l2tpv3** L2TPv3 information
- **ldap-agent** LDAP Agent Configuration
- **licenses** Show installed licenses and usage
- **lldp** Link Layer Discovery Protocol
- **logging** Show logging information
- **mac-access-list** MAC ACL
- **mac-address-table** Display MAC address table
- **mac-auth** MAC authentication
- **mac-auth-clients** MAC authenticated clients
- **mint** MiNT protocol
- **mirroring** Show mirroring sessions
- **nsight** Nsight Server Module
- **ntp** Network time protocol
- **password-encryption** Password encryption
- **pppoe-client** PPP Over Ethernet client
- **privilege** Show current privilege level
- **radius** RADIUS statistics commands
- **raid** Show RAID status
- **reload** Scheduled reload information
- **remote-debug** Show details of remote debug sessions
- **rf-domain-manager** Show RF Domain Manager selection details
- **role** Role based firewall
- **route-maps** Display Route Map Statistics
- **rtls** RTLS Statistics
- **running-config** Current operating configuration
- **session-changes** Configuration changes made in this session
- **session-config** This session configuration
- **sessions** Display CLI sessions
- **site-config-diff** Difference between site configuration on the NOC and actual site configuration
- **slot** Expansion slots stats
- **smart-cache** Content caching
<table>
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<tr>
<th>Command</th>
<th>Description</th>
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<tbody>
<tr>
<td>smart-rf</td>
<td>Smart-RF Management Commands</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Display spanning tree information</td>
</tr>
<tr>
<td>startup-config</td>
<td>Startup configuration</td>
</tr>
<tr>
<td>t5</td>
<td>T5 details</td>
</tr>
<tr>
<td>terminal</td>
<td>Display terminal configuration parameters</td>
</tr>
<tr>
<td>timezone</td>
<td>The timezone</td>
</tr>
<tr>
<td>traffic-shape</td>
<td>Display traffic shaping</td>
</tr>
<tr>
<td>upgrade-status</td>
<td>Display last image upgrade status</td>
</tr>
<tr>
<td>version</td>
<td>Display software &amp; hardware version</td>
</tr>
<tr>
<td>virtual-machine</td>
<td>Virtual Machine</td>
</tr>
<tr>
<td>vrrp</td>
<td>VRRP protocol</td>
</tr>
<tr>
<td>web-filter</td>
<td>Web filter</td>
</tr>
<tr>
<td>what</td>
<td>Perform global search</td>
</tr>
<tr>
<td>wireless</td>
<td>Wireless commands</td>
</tr>
<tr>
<td>wwan</td>
<td>Display wireless WAN Status</td>
</tr>
</tbody>
</table>

rfs7000-37FABE#show terminal
Terminal Type: xterm
Length: 24     Width: 80
rfs7000-37FABE#

**User Exec Mode**

```bash
<DEVICE>## show ?
```

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>adoption</td>
<td>Adoption related information</td>
</tr>
<tr>
<td>bluetooth</td>
<td>Bluetooth Configuration/Statistics commands</td>
</tr>
<tr>
<td>boot</td>
<td>Display boot configuration.</td>
</tr>
<tr>
<td>captive-portal</td>
<td>Captive portal commands</td>
</tr>
<tr>
<td>captive-portal-page-upload</td>
<td>Captive portal advanced page upload</td>
</tr>
<tr>
<td>cdp</td>
<td>Cisco Discovery Protocol</td>
</tr>
<tr>
<td>classify-url</td>
<td>Query the category of an URL</td>
</tr>
<tr>
<td>clock</td>
<td>Display system clock</td>
</tr>
<tr>
<td>cluster</td>
<td>Cluster Protocol</td>
</tr>
<tr>
<td>cmp-factory-certs</td>
<td>Display the CMP certificate status</td>
</tr>
<tr>
<td>commands</td>
<td>Show command lists</td>
</tr>
<tr>
<td>context</td>
<td>Information about current context</td>
</tr>
<tr>
<td>critical-resources</td>
<td>Critical Resources</td>
</tr>
<tr>
<td>crypto</td>
<td>Encryption related commands</td>
</tr>
<tr>
<td>database</td>
<td>Database</td>
</tr>
<tr>
<td>debug</td>
<td>Debugging functions</td>
</tr>
<tr>
<td>debugging</td>
<td>Debugging functions</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Device Upgrade</td>
</tr>
<tr>
<td>dot1x</td>
<td>802.1X</td>
</tr>
<tr>
<td>dpi</td>
<td>Deep Packet Inspection</td>
</tr>
<tr>
<td>environmental-sensor</td>
<td>Display Environmental Sensor Module status</td>
</tr>
<tr>
<td>event-history</td>
<td>Display event history</td>
</tr>
<tr>
<td>event-system-policy</td>
<td>Display event system policy</td>
</tr>
<tr>
<td>ex3500</td>
<td>EX3500 device details</td>
</tr>
<tr>
<td>extdev</td>
<td>External device (T5, EX3500..)</td>
</tr>
<tr>
<td>file</td>
<td>Display filesystem information</td>
</tr>
<tr>
<td>file-sync</td>
<td>File sync between controller and adoptees</td>
</tr>
<tr>
<td>firewall</td>
<td>Wireless Firewall</td>
</tr>
<tr>
<td>global</td>
<td>Global-level information</td>
</tr>
<tr>
<td>gre</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>guest-registration</td>
<td>Guest registration commands</td>
</tr>
<tr>
<td>interface</td>
<td>Interface Configuration/Statistics commands</td>
</tr>
<tr>
<td>ip</td>
<td>Internet Protocol (IP))</td>
</tr>
<tr>
<td>ipv6</td>
<td>Internet Protocol version 6 (IPv6)</td>
</tr>
<tr>
<td>licenses</td>
<td>Show installed licenses and usage</td>
</tr>
<tr>
<td>lldp</td>
<td>Link Layer Discovery Protocol</td>
</tr>
<tr>
<td>logging</td>
<td>Show logging information</td>
</tr>
<tr>
<td>mac-address-table</td>
<td>Display MAC address table</td>
</tr>
<tr>
<td>mac-auth</td>
<td>MAC authentication</td>
</tr>
<tr>
<td>mac-auth-clients</td>
<td>MAC authenticated clients</td>
</tr>
<tr>
<td>mint</td>
<td>MiNT protocol</td>
</tr>
<tr>
<td>mirroring</td>
<td>Show mirroring sessions</td>
</tr>
<tr>
<td>nsight</td>
<td>Nsight Server Module</td>
</tr>
<tr>
<td>ntp</td>
<td>Network time protocol</td>
</tr>
<tr>
<td>password-encryption</td>
<td>Password encryption</td>
</tr>
<tr>
<td>pppoe-client</td>
<td>PPP Over Ethernet client</td>
</tr>
</tbody>
</table>
privilege                   Show current privilege level
radius                     RADIUS statistics commands
rf-domain-manager          Show RF Domain Manager selection details
role                       Role based firewall
route-maps                 Display Route Map Statistics
rtl                        RTLS Statistics
running-config             Current operating configuration
session-changes            Configuration changes made in this session
session-config             This session configuration
sessions                   Display CLI sessions
site-config-diff           Difference between site configuration on the NOC
                           and actual site configuration
slot                       Expansion slots stats
smart-rf                   Smart-RF Management Commands
spanning-tree              Display spanning tree information
startup-config             Startup configuration
t5                         T5 details
terminal                   Display terminal configuration parameters
timezone                   The timezone
traffic-shape              Display traffic shaping
version                    Display software & hardware version
vrrp                       VRRP protocol
web-filter                  Web filter
what                       Perform global search
wireless                   Wireless commands
wwan                       Display wireless WAN Status

<DEVICE>>

nx9500-6C8809(config)#show wireless ap configured

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap8132-74B45C</td>
<td>B4-C7-99-74-B4-5C</td>
<td>default-ap81xx</td>
<td>default</td>
<td>B4-C7-99-6D-B5-D4</td>
</tr>
<tr>
<td>2</td>
<td>ap6522-587258</td>
<td>B4-C7-99-58-72-58</td>
<td>default-ap6522</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>3</td>
<td>ap8132-711728</td>
<td>B4-C7-99-71-17-28</td>
<td>default-ap81xx</td>
<td>default</td>
<td>B4-C7-99-5C-FA-8E</td>
</tr>
<tr>
<td>4</td>
<td>rfs4000-880DA7</td>
<td>00-23-68-88-0D-A7</td>
<td>default-rfs4000</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
<tr>
<td>5</td>
<td>ap7131-11E6C4</td>
<td>00-23-68-11-E6-C4</td>
<td>default-ap71xx</td>
<td>default</td>
<td>B4-C7-99-6D-B5-D4</td>
</tr>
<tr>
<td>6</td>
<td>rfs4000-229D58</td>
<td>00-23-68-22-9D-58</td>
<td>default-rfs4000</td>
<td>default</td>
<td>B4-C7-99-6C-88-09</td>
</tr>
</tbody>
</table>

nx9500-6C8809(config)#

The following Show commands are specific to the NX45XX and NX65XX series service platforms:

nx4500-5CFA2B>show slot

<table>
<thead>
<tr>
<th>SLOT</th>
<th>TYPE</th>
<th>MODULE</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>[]</td>
<td>wing</td>
<td>Enabled</td>
</tr>
<tr>
<td>2</td>
<td>[]</td>
<td>wing</td>
<td>Enabled</td>
</tr>
<tr>
<td>3</td>
<td>[]</td>
<td>wing</td>
<td>Enabled</td>
</tr>
<tr>
<td>4</td>
<td>[]</td>
<td>wing</td>
<td>Enabled</td>
</tr>
</tbody>
</table>

nx4500-5CFA2B>

nx4500-5CFA2B#show smart-cache ?
active-requests  Active requests
clients          Client list
purge-requests   Purge-requests
statistics       Statistics
storage          Storage

nx4500-5CFA2B#
nx4500-5CFA2B#show smart-cache storage
-------------------------
USED     TOTAL     USAGE
-------------------------
  1592  33554432   0%  
-------------------------
nx4500-5CFA2B#

nx4500-5CFA2B(config)#show smart-cache statistics
-----------------------------------------------------
DURATION | DATA (KB) | BANDWIDTH (Kbps) | REQUESTS
---------|-----------|------------------|-----------
Since boot | 0 | 0 | 0 | 0 | 0 | 0
-----------------------------------------------------
nx4500-5CFA2B(config)#

nx4500-5CFA2B(config)#show virtual-machine statistics
----------------------------------------------------------
NAME | STATE | VCPUS | MEM (MB) | BRIDGE-IF | IP
-----|-------|-------|----------|-----------|-----
team-rls | (not_installed) | - | - | - | -
team-urc | Running | 1 | 1200 | eth0 (vmif2) | 192.168.13.103
team-vowlan | (not_installed) | - | - | - | -
----------------------------------------------------------
nx4500-5CFA2B(config)#

The following Show commands are specific to the NX9500 series service platform:

nx9500-6C874D>show raid
Logical drive info:
  Size 930 GB, State optimal
  Alarm enabled
  Last check: Tue Jun  2 20:37:20 2015
  Last check result: done

Physical drive info:
  Drive slot 0: online
  Drive slot 1: online
  Drive slot 2: not-installed
  Drive slot 3: not-installed
  Drive slot 4: not-installed
nx9500-6C874D>

The following show commands are specific to the NX9500 and NX9510 series service platforms:

nx9500-6C874D(config)#show virtual-machine configuration
-------------------------------------------------------------
NAME | AUTOSTART | MEMORY (MB) | VCPUS
-----|-----------|-------------|-----
WING | - | 16384 | -
adsp | start | 16384 | 12
team-cmt | start | 1024 | 1
-------------------------------------------------------------
nx9500-6C874D(config)#
6.1.2 adoption

show commands

Displays adoption related information, and is common to the User Exec, Priv Exec, and Global Config modes.

In an hierarchically managed (HM) network devices are deployed in two levels. The first level consists of the Network Operations Center (NOC) controllers. The second level consists of the site controllers that can be grouped to form clusters. The NOC controllers adopt and manage the site controllers. Access points within the network are adopted and managed by the site controllers. The adopted devices (access points and second-level controllers) are referred to as the adoptee. The devices adopting the adoptee are the ‘adopters’.

Use this command to confirm if a device is an adoptee or an adopter. This command also allows you to determine the devices adopted by an adopter device.

**NOTE:** A NOC controller’s capacity is equal to or higher than a site controller’s capacity. The following devices can be deployed at NOC and sites:

- NOC controller – RFS6000, RFS7000, NX65XX, NX9000, NX9500, NX9510, or NX9600.
- Site controller – NX45XX, NX65XX, RFS7000, RFS6000, or RFS4000.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show adoption [config-errors|controllers|history|info|log|offline|pending|status|timeline]

show adoption offline
show adoption config-errors <DEVICE-NAME>
show adoption log [adoptee adopter {<MAC>}] {on <DEVICE-NAME>}
show adoption [controllers|history|info|pending|status|timeline] {on <DEVICE-NAME>}

Parameters

- show adoption offline

| adoption | Displays adoption related information. It also displays configuration errors. |
| offline | Displays non-adopted status of the logged device and its adopted access points |

- show adoption config-errors <DEVICE-NAME>

| adoption | Displays adoption related information. It also displays configuration errors. |
| config-errors <DEVICE-NAME> | Displays configuration errors for a specified adopted device  |
| | • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

- show adoption log [adoptee adopter {<MAC>}] {on <DEVICE-NAME>}

<p>| adoption | Displays adoption related information. It also displays configuration errors. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| **log [adoptee] adopter {MAC}** {on <DEVICE-NAME>} | Displays adoption logs, for the specified device. If no device name is specified, the system displays logs for the logged device.  
  
  - adoptee – Displays adoption logs for adoptee devices (APs, wireless controllers, and service platforms). To view logs for a specified adoptee, specify the device’s name. If no device name is specified, the system displays logs for the logged device. If the logged device is not an adoptee, the system states that the device is a controller.  
  
  For example, 2013-01-19 22:00:13:MLCP_TAG_CLUSTER_MASTER not present and this device is a controller. Ignoring  
  
  - on <DEVICE-NAME> – Optional. Displays adoptee status and details for the device identified by the <DEVICE-NAME> keyword  
    - <DEVICE-NAME> – Specify the device’s name.  
  
  - adopter – Displays adoption logs for adopter devices (APs, wireless controllers, and service platforms). To view logs for a specified adopter, specify the device’s name. If no device name is specified, the system displays logs for the logged device.  
    - <MAC> – Optional. Filters adopters by the adoptee device’s MAC address. Specify the adoptee device’s MAC address. The system displays logs for the device that has adopted the device identified by the <MAC> keyword.  
    - on <DEVICE-NAME> – Optional. Displays adopter status and details for the device identified by the <DEVICE-NAME> keyword.  
    - <DEVICE-NAME> – Specify the adopter device’s name.  
  
  **Note:** A wireless controller or service platform cannot be configured as an adoptee and an adopter simultaneously. In other words, an adopted wireless controller or service platform cannot be configured to adopt another device and vice versa. |
| **adoption** {on <DEVICE-NAME>} | Displays adoption related information. It also displays configuration errors. |
| **controllers** | Displays information about adopted controllers. This is applicable in a Hierarchically managed network, where site controllers are adopted by the NOC controllers. |
| **history** | Displays adoption history of the logged device and its adopted access points |
| **info** | Displays adopted device information |
| **pending** | Displays information for devices pending adoption |
| **status** | Displays adoption status for logged devices |
| **timeline** | Displays the logged device’s adoption timeline. It also shows the adoption time for logged device’s adopted APs. To view the adoption timeline of a specific device, use the on <device-name> option to specify the device. |
| **on <DEVICE-NAME>** | The following keywords are common to all of the above parameters:  
  
  - on <DEVICE-NAME> – Optional. Displays a device’s adoption information, based on the parameter passed.  
  
  - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
Usage Guidelines

In a device’s Global Config mode, use the `customize > show-adoption-status` command to customize the `show > adoption > status` command output. The following columns can be added to the output:

```
adopted-by     Device name to which the AP is adopted
ap-name        Host-name of the adopted AP
cdp-lldp-info  Cdp/lldp info of the Adopted AP
config-status  Configuration status of the adopted AP
last-adoption  Last known adoption time
msgs           Messages status
uptime         Uptime of the adopted AP
version        Current version of the adopted AP
```

nx9500-6C8809(config)#customize show-adoption-status ?

For more information on the customize command, see `customize`.

Examples

The following example displays details of the:

- logged device (rfs6000-81742D), and
- devices adopted (ap8132-711728) by the logged device.

```
rfs6000-81742D#show adoption status
Adopted by:
  Type          : RFS7000
  System Name   : rfs7000-6DCD4B
  MAC address   : B4-C7-99-6D-CD-4B
  MiNT address  : 19.6D.CD.4B
  Time          :   0 days 00:18:43 ago
Adopted Devices:
------------------------------------------------------------------------
ADOPTED-BY        DEVICE-NAME       CFG-STAT       LAST-ADOPTION
------------------------------------------------------------------------
rfs6000-81742D    ap8132-711728   configured     0 days 00:05:20
------------------------------------------------------------------------
Total number of devices displayed: 1
```

```
x9500-6C8809#show adoption info
------------------------------------------------------------------------
HOST-NAME        MAC           TYPE               MODEL    SERIAL-NUMBER
------------------------------------------------------------------------
ap7131-99BB7C    00-23-68-99-BB-7C  ap71xx            AP7131N   10160520900093
ap7532-80C2AC    84-24-8D-80-C2-AC  ap7532   AP-7532-67040-WR   14289522200250
ap7562-84A224    84-24-8D-84-A2-24  ap7562   AP-7562-67040-US   15015522201502
------------------------------------------------------------------------
Total number of devices displayed: 3
```

```
x9500-6C8809#show adoption status
DEVICE-NAME     VERSION        CFG-STAT          MSGS   ADOPTED-BY     LAST-ADOPTION       UPTIME
------------------------------------------------------------------------
ap7131-99BB7C   5.8.4.0-024D  configured       No  nx9500-6C8809  0 days 01:46:59   0 days 01:53:22
ap7131xx-9C63D4 5.8.1.0-006D  version-mismatch No  nx9500-6C8809  0 days 01:47:01  20 days 06:18:36
ap7532-80C2AC    5.8.4.0-024D  configured       No  nx9500-6C8809  0 days 01:39:47   0 days 01:40:59
ap7562-84A224    5.8.4.0-024D  configured       No  nx9500-6C8809  0 days 01:46:57   0 days 01:48:40
ap7131xx-4BF364 5.8.4.0-015D  version-mismatch No  nx9500-6C8809  0 days 01:47:02  13 days 03:59:02
ap8132-74B45C    5.8.4.0-024D  configured       No  nx9500-6C8809  0 days 01:32:29   0 days 01:34:00
ap7131xx-9C63D4 5.8.2.0-010R  configured       No  nx9500-6C8809  0 days 01:47:47   26 days 04:18:30-
------------------------------------------------------------------------
Total number of devices displayed: 7
```

```
x9500-6C8809#
```
nx9500-6C8809# show adoption offline

<table>
<thead>
<tr>
<th>MAC</th>
<th>HOST-NAME</th>
<th>TYPE</th>
<th>RF-DOMAIN</th>
<th>TIME OFFLINE</th>
<th>CONNECTED-TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-22-33-44-55-66</td>
<td>t5-445566</td>
<td>t5</td>
<td>default</td>
<td>unknown</td>
<td>None</td>
</tr>
<tr>
<td>B4-C7-99-58-72-58</td>
<td>ap6522-587258</td>
<td>ap6522</td>
<td>default</td>
<td>unknown</td>
<td>None</td>
</tr>
<tr>
<td>B4-C7-99-71-17-28</td>
<td>ap8132-711728</td>
<td>ap81xx</td>
<td>default</td>
<td>unknown</td>
<td>None</td>
</tr>
<tr>
<td>B4-C7-99-74-B4-5C</td>
<td>ap8132-74B45C</td>
<td>ap81xx</td>
<td>default</td>
<td>unknown</td>
<td>None</td>
</tr>
</tbody>
</table>

Total number of devices displayed: 4

nx9500-6C8809#

ap7131-11B6C4(config)# show adoption log adoptee
2016-02-04 03:44:52:Received OK from cfgd, adoption complete to 70.81.74.2D
2016-02-04 03:44:52:Waiting for cfgd OK, adopter should be 70.81.74.2D
2016-02-04 03:44:52:Adoption state change: 'Connecting to adopter' to 'Waiting for Adoption OK'
2016-02-04 03:44:52:Adoption state change: 'No adopters found' to 'Connecting to adopter'
2016-02-04 03:44:52:Try to adopt to 70.81.74.2D (cluster master 70.81.74.2D in adopters)
2016-02-04 03:44:52:Got new value for MTU: 1500 Was: 0
2016-02-04 03:44:52:MLCP created VLAN link on VLAN 1, offer from 00-15-70-81-74-2D
2016-02-04 03:44:52:Sending MLCP Request to 00-15-70-81-74-2D vlan 1
2016-02-04 03:44:48:Received 0 hostnames through DHCP option 191
2016-02-04 03:44:47:Adoption state change: 'Disabled' to 'No adopters found'
2016-02-04 03:44:47:DNS resolution completed, starting MLCP
2016-02-04 03:44:47:Adoption enabled due to configuration

ap7131-11B6C4(config)#

nx9500-6C8809# show adoption controllers

<table>
<thead>
<tr>
<th>NAME</th>
<th>RF-DOMAIN</th>
<th>MAC</th>
<th>MINT-ID</th>
<th>IP</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs6000-380649</td>
<td>default</td>
<td>00-15-70-38-06-49</td>
<td>70.38.06.49</td>
<td>192.168.13.6</td>
<td>nx9500-6C8809</td>
</tr>
<tr>
<td>nx4500-5CFA8E</td>
<td>default</td>
<td>B4-C7-99-5C-FA-8E</td>
<td>19.5C.FA.8E</td>
<td>192.168.0.1</td>
<td>nx9500-6C8809</td>
</tr>
<tr>
<td>rfs6000-6DB5D4</td>
<td>default</td>
<td>B4-C7-99-6D-B5-D4</td>
<td>19.6D.B5.D4</td>
<td>192.168.13.16</td>
<td>nx9500-6C8809</td>
</tr>
</tbody>
</table>

Total number of devices displayed: 4

nx9500-6C8809#

nx9500-6C8809(config)# show adoption history

<table>
<thead>
<tr>
<th>MAC</th>
<th>TYPE</th>
<th>EVENT</th>
<th>TIME-STAMP</th>
<th>REASON</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4-C7-99-74-B4-5C</td>
<td>ap81xx</td>
<td>adopted</td>
<td>2016-02-01 22:06:08</td>
<td>N.A.</td>
</tr>
<tr>
<td>00-23-68-99-BB-7C</td>
<td>ap71xxx</td>
<td>adopted</td>
<td>2016-02-01 21:59:44</td>
<td>N.A.</td>
</tr>
<tr>
<td>B4-C7-99-74-B4-5C</td>
<td>ap81xx</td>
<td>adopted</td>
<td>2016-02-01 21:53:24</td>
<td>N.A.</td>
</tr>
<tr>
<td>84-24-8D-80-C2-AC</td>
<td>ap7532</td>
<td>adopted</td>
<td>2016-02-01 21:53:23</td>
<td>N.A.</td>
</tr>
<tr>
<td>00-23-68-99-BB-7C</td>
<td>ap71xxx</td>
<td>adopted</td>
<td>2016-02-01 21:53:20</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

nx9500-6C8809(config)#
6.1.3 bluetooth

▶ show commands

Displays Bluetooth radio statistics for RF Domain member access points

AP8432 and AP8533 model access points utilize a built-in Bluetooth chip for specific Bluetooth functional behaviors in a WiNG managed network. AP8432 and AP8533 models support both Bluetooth classic and Bluetooth low energy (BLE) technology. These platforms use their Bluetooth classic enabled radio to sense other Bluetooth enabled devices and report device data (MAC address, RSSI and device calls) to an ADSP server for intrusion detection. If the device presence varies in an unexpected manner, ADSP can raise an alarm.

NOTE: AP8132 model access points support an external USB Bluetooth radio providing ADSP Bluetooth classic sensing functionality only, not the BLE beaconing functionality available for AP8432 and AP8533 model access points described in this section.

AP8432 and AP8533 model access points support Bluetooth beaconing to emit either iBeacon or Eddystone-URL beacons. The access point’s Bluetooth radio sends non-connectable, undirected low-energy (LE) advertisement packets periodically. These advertisement packets are short and sent on Bluetooth advertising channels that conform to already-established iBeacon and Eddystone-URL standards.

Supported in the following platforms:
- Access Points — AP8432, AP8533

Syntax

```plaintext
show bluetooth radio {detail|on}
```

show bluetooth radio {detail {<DEVICE-NAME> <1-1>|filter bluetooth-radio-mac <BT-RADIO-MAC>}} {(on <DEVICE-OR-DOMAIN-NAME>)}

Parameters

- show bluetooth radio {detail {<DEVICE-NAME> <1-1>|filter bluetooth-radio-mac <BT-RADIO-MAC>}} {(on <DEVICE-OR-DOMAIN-NAME>)}

<table>
<thead>
<tr>
<th>Bluetooth radio</th>
<th>Displays Bluetooth radio utilization statistics based on the parameters passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>detail</td>
<td>Optional. Displays detailed Bluetooth radio utilization statistics. Optionally, to view detailed information for a specific access point’s Bluetooth radio, specify the access point’s and the radio’s MAC addresses.</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
<td>- Optional. Specify the access point’s hostname or MAC address.</td>
</tr>
<tr>
<td>&lt;1-1&gt;</td>
<td>- Specify the bluetooth radio interface index number from 1 - 1. As of now only one Bluetooth radio interface is supported. The Interface index number is appended to the AP’s hostname or MAC address in the following format: ap8533-06FBE1:B1 OR 74-67-F7-06-FB-E1:B1</td>
</tr>
<tr>
<td></td>
<td>The following information is displayed:</td>
</tr>
<tr>
<td></td>
<td>• access point’s hostname as its network identifier</td>
</tr>
<tr>
<td></td>
<td>• access point’s alias. If an alias has been defined for the access point its listed here. The alias value is expressed in the form of &lt;hostname&gt;:B&lt;Bluetooth_radio_number&gt;. If the access point has an administrator assigned hostname, it is used in place of the access point’s default hostname.</td>
</tr>
<tr>
<td></td>
<td>• access point’s factory encoded MAC address</td>
</tr>
<tr>
<td></td>
<td>• access point and bluetooth radio’s administrator assigned area of deployment (the AP’s geographical location)</td>
</tr>
<tr>
<td></td>
<td>Contd..</td>
</tr>
</tbody>
</table>
SHOW COMMANDS

Examples

```
nx9500-6C8809(config)#show bluetooth radio on ap8533-06F808
-----------------------------------------------------------------------------
BLUETOOTH RADIO      RADIO MAC           MODES                     STATE
-----------------------------------------------------------------------------
ap8533-06F808:B1  74-67-F7-08-A3-B0    BLE-Beacon                  On
-----------------------------------------------------------------------------
Total number of Bluetooth radios displayed: 0
nx9500-6C8809(config)#
```

```
nx9500-6C8809(config)#show bluetooth radio detail 74-67-F7-06-F8-08 1
Radio: 74-67-F7-06-F8-08:B1, alias ap8533-06F808:B1
  STATE          : Off [shutdown in cfg]
  PHY INFO       : MAC: 74-67-F7-08-A3-B0
  ACCESS POINT   : Name: ap8533-06F808 Location: default Placement: Indoor
  ENABLED MODES : BLE-Beacon
  BEACON TYPES  : Eddystone-URL
  BEACON PERIOD : 1000ms
  Last error    :

nx9500-6C8809(config)#
```
6.1.4 boot

show commands

Displays a device’s boot configuration. Use this command to view the primary and secondary image details, such as Build Date, Install Date, and Version. This command also displays the current boot and next boot information.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show boot {on <DEVICE-NAME>}

Parameters

- show boot {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>boot on &lt;DEVICE-NAME&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays primary and secondary image boot configuration details (build date, install date, version, and the image used to boot the current session)</td>
</tr>
<tr>
<td>Optional. Displays a specified device’s boot configuration</td>
</tr>
<tr>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td><strong>Note:</strong> Use the on &lt;DEVICE-NAME&gt; option to view a remote device’s boot configuration.</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58(config)#show boot
--------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>IMAGE</th>
<th>BUILD DATE</th>
<th>INSTALL DATE</th>
<th>VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>04/28/2016 09:40:59</td>
<td>04/29/2016 16:39:51</td>
<td>5.8.4.0-008D</td>
</tr>
<tr>
<td>Secondary</td>
<td>04/22/2016 20:26:01</td>
<td>04/25/2016 16:11:02</td>
<td>5.8.4.0-007D</td>
</tr>
</tbody>
</table>
--------------------------------------------------------------------------------
Current Boot : Primary
Next Boot : Primary
Software Fallback : Enabled
rfs4000-229D58(config)#
6.1.5 **bonjour**

Show commands

Displays the configured Bonjour services available on local and remote sites

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show bonjour services [on <DEVICE-NAME>]
```

**Parameters**

- `show bonjour services [on <DEVICE-NAME>]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bonjour services</td>
<td>Displays the configured Bonjour services available on local and remote sites</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays Bonjour services available on a specified device</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE#show bonjour services on ap7131-11E6C4

<table>
<thead>
<tr>
<th>SERVICE_NAME</th>
<th>INSTANCE_NAME</th>
<th>IP:PORT</th>
<th>VLAN-ID</th>
<th>VLAN_TYPE</th>
<th>EXPIRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>_home-sharing._tcp.local</td>
<td>bob’s</td>
<td>41.41.112:3689</td>
<td>41</td>
<td>Local</td>
<td>Fri Feb 28 02:26:24 2014</td>
</tr>
<tr>
<td>Library_05ADD1A24FA8_1._home-sharing._tcp.local</td>
<td>bob’s</td>
<td>41.41.112:3689</td>
<td>41</td>
<td>Local</td>
<td>Fri Feb 28 02:26:24 2014</td>
</tr>
</tbody>
</table>
```

rfs7000-37FABE#
### 6.1.6 captive-portal

#### show commands

Displays WLAN captive portal information. Use this command to view a configured captive portal's client information.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
show captive-portal sessions {include-ipv6|on <DEVICE-OR-DOMAIN-NAME>|statistics}
```

#### Parameters

- **captive-portal sessions**
  Displays active captive portal client session details

- **include-ipv6**
  Optional. Includes IPv6 address (if known) of captive portal clients
  
  **Note**: By default the system only displays IPv4 addresses. The include-ipv6 parameter includes IPv6 address (if known) of each client.

- **statistics**
  Optional. Displays statistical information regarding client sessions

- **on <DEVICE-OR-DOMAIN-NAME>**
  Optional. Displays active captive portal session details on a specified device or RF Domain.
  - `<DEVICE-OR-DOMAIN-NAME>` – Specify the name of the AP, wireless controller, service platform, or RF Domain.

- **filter**
  This parameter is recursive and can be used with any of the above parameters to define additional filters.
  Optional. Defines additional filters. Use one of the following options: captive-portal, ip, ipv6, state, vlan, or wlan.

- **captive-portal [<CAPTIVE-PORTAL>|not <CAPTIVE-PORTAL>]**
  Optional. Displays captive portal client and client session information, based on the captive portal name passed
  - `<CAPTIVE-PORTAL>` – Specify the captive portal name. Displays client details for the specified captive portal.
  - not `<CAPTIVE-PORTAL>` – Inverts the match selection. Displays client details for all captive portals other than the specified captive portal.

- **ip [<IPv4>|not <IPv4>]**
  Optional. Displays captive portal client/client sessions information, based on the IPv4 address passed
  - `<IPv4>` – Specify the client's IPv4 address. Displays information of the client identified by the `<IPv4>` parameter
  - not `<IPv4>` – Inverts the match selection. Displays client details for all clients other than the one identified by the `<IPv4>` parameter.
### Examples

```
rfs4000-229D58#show captive-portal sessions
=======================================================================================
CLIENT     IPv4     CAPTIVE-PORTAL   WLAN/PORT    VLAN  STATE  SESSION  TIME
---------------------------------------------------------------------------------------
00-26-55-F4-5F-79  192.168.3.99 cappo     rfs4000-229D58:ge2    400     Success     23:58:35
=======================================================================================
```

Total number of captive portal sessions displayed: 1

```
rfs4000-229D58#
```
### 6.1.7 captive-portal-page-upload

**show commands**

Displays captive portal page information, such as upload history, upload status, and page file download status

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP61XX, AP62XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

- `show captive-portal-page-upload [history|list-files|load-image-status|status]`
- `show captive-portal-page-upload load-image-status`
- `show captive-portal-page-upload history {on <RF-DOMAIN-NAME>}`
- `show captive-portal-page-upload status {on [ <RF-DOMAIN-NAME> | <RF-DOMAIN-MANAGER> ]}`
- `show captive-portal-page-upload list-files <CAPTIVE-PORTAL-NAME>`

**Parameters**

- `load-image-status` Displays captive portal advanced page file download status on the logged device

<table>
<thead>
<tr>
<th>load-image-status</th>
<th>Displays captive portal advanced page file download status on the logged device</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show captive-portal-page-upload history {on &lt;RF-DOMAIN-NAME&gt;}</code></td>
<td>Displays captive portal page upload history</td>
</tr>
<tr>
<td>history {on &lt;RF-DOMAIN-NAME&gt;}]</td>
<td>Displays captive portal page upload history</td>
</tr>
<tr>
<td>status {on &lt;RF-DOMAIN-NAME&gt;</td>
<td>on &lt;RF-DOMAIN-MANAGER&gt;}]</td>
</tr>
<tr>
<td>list-files &lt;CAPTIVE-PORTAL-NAME&gt;</td>
<td>Displays a list of all captive portal Web page files, of a specified captive portal, uploaded (internal and advanced page files)</td>
</tr>
</tbody>
</table>

**Examples**

```
nx7500-7F2C13# captive-portal-page-upload CP-BW all
--------------------------------------------------------------------------------
CONTROLLER   STATUS                 MESSAGE
--------------------------------------------------------------------------------
84-24-8D-7F-2C-13 Success Added 1 APs to upload queue
--------------------------------------------------------------------------------
nx7500-7F2C13#
```

```
nx7500-7F2C13# show captive-portal-page-upload load-file-status
Download of CP-BW page file is complete
```

```
nx7500-7F2C13#
```
nx7500-7F2C13#show captive-portal-page-upload list-files CP-BW

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIZE</th>
<th>LAST MODIFIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP-BW-1.tar.gz</td>
<td>6133</td>
<td>2016-05-16 10:38:40</td>
</tr>
<tr>
<td>CP-BW.tar.gz</td>
<td>3370</td>
<td>2016-05-16 10:45:44</td>
</tr>
</tbody>
</table>

nx7500-7F2C13#
6.1.8 cdp

› show commands
Displays the Cisco Discovery Protocol (CDP) neighbor table

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
show cdp [neighbors|report] {detail {on <DEVICE-NAME>}|on <DEVICE-NAME>}

Parameters
- show cdp [neighbors|report] {detail {on <DEVICE-NAME>}|on <DEVICE-NAME>}

| cdp [neighbors|report] | Displays CDP neighbors table or aggregated CDP neighbors table |
|------------------------|---------------------------------------------------------------|
| detail {on <DEVICE-NAME>} | Optional. Displays detailed CDP neighbors table or aggregated CDP neighbors table |
|                        | • on <DEVICE-NAME> – Optional. Displays table details on a specified device |
|                        | • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| on <DEVICE-NAME> | Optional. Displays table details on a specified device |
|                        | • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

Examples
The following example shows detailed CDP neighbors table:

nx4500-5CFA2B#show cdp neighbors detail
-------------------------
Device ID: rfs7000-6DCD4B
Entry address(es):
  IP Address: 192.168.0.1
  IP Address: 172.18.0.2
  IP Address: 192.168.13.25
Platform: RFS-7010-1000-WR, Capabilites: Router Switch
Interface: up1, Port ID (outgoing port): ge2
Hold Time: 159 sec
advertisement version: 2
Native VLAN: 192
Duplex: full
Version : 5.8.4.0-008D
-------------------------
Device ID: rfs6000-6DB5D4
Entry address(es):
  IP Address: 192.168.13.16
Platform: RFS-6010-1000-WR, Capabilites: Router Switch
Interface: up1, Port ID (outgoing port): ge1
Hold Time: 171 sec
--More--
nx4500-5CFA2B#
The following example shows a non-detailed CDP neighbors table:

```
nx4500-5CFA2B#show cdp neighbors
+-----------------------------------------------------+----------+----------+----------+----------+
| Device ID       | Platform       | Local Interface | Port ID  | Duplex   |
+-----------------------------------------------------+----------+----------+----------+----------+
| rfs7000-6DCD4B  | RFS-7010-1000-WR | up1          | ge2      | full     |
| rfs6000-6DB5D4  | RFS-6010-1000-WR | up1          | ge1      | full     |
| rfs7000-181091  | RFS-7010-1000-WR | up1          | ge1      | full     |
| nx9500-6C8809   | NX-9500-100R0-WR | up1          | ge1      | full     |
+-----------------------------------------------------+----------+----------+----------+----------+
nx4500-5CFA2B#rfs7000-6DCD4B>show cdp neighbors
+-----------------------------------------------------+----------+----------+----------+----------+
| Device ID       | Platform       | Local Interface | Port ID  | Duplex   |
+-----------------------------------------------------+----------+----------+----------+----------+
| ap8132-74B45C   | AP-8132-66040-WR | ge2          | ge1      | full     |
| CiscoLab        | cisco WS-C2960S-24PS-L | ge2          | GigabitEthernet1/0/3 | full |
| nx4500-5CFA8E   | NX-4500-0000-00-WR | ge2          | up1      | full     |
| L3-Router       | RFS-4010-00010-WR | ge1          | ge2      | full     |
| nx4500-5CFA2B   | NX-4500-0000-00-WR | ge2          | up1      | full     |
| rfs7000-6DCD4B  |
```

6.1.9 `classify-url`

Displays a specified URL’s category. Use this command to query the category of a specific URL. The query is sent to a configured classification server. This option is available only if a valid URL filter license is available.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
show classify-url [<URL-TO-QUERY>|datacenter <URL-TO-QUERY>]
```

Parameters

- `show classify-url [<URL-TO-QUERY>|datacenter <URL-TO-QUERY>]`

<table>
<thead>
<tr>
<th>classify-url</th>
<th>Queries the category of a specified URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;URL-TO-QUERY&gt;</td>
<td>Specify the URL to query. The query is sent to the configured classification server.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>datacenter &lt;URL-TO-QUERY&gt;</th>
<th>The query is sent to a global classification datacenter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- &lt;URL-TO-QUERY&gt; – Specify the URL to query.</td>
</tr>
</tbody>
</table>

Examples

```
nx4500-5CFA2B#show classify-url www.google.com
Categories: search-engines-portals,
Custom Categories:
nx4500-5CFA2B#
```

```
nx4500-5CFA2B#show classify-url www.ndtv.com
Categories: news,
Custom Categories: list1,
nx4500-5CFA2B#
```
6.1.10 clock

show commands

Displays a selected system’s clock

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show clock \{on <DEVICE-NAME>\}

Parameters

- show clock \{on <DEVICE-NAME>\}

<table>
<thead>
<tr>
<th>clock</th>
<th>Displays a system’s clock</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays system clock on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config)#show clock
2016-05-13 12:06:26  UTC
rfs7000-37FABE(config)#
## 6.1.11 cluster

> **show commands**

Displays cluster information (cluster configuration parameters, members, status, etc.)

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP91XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

```plaintext
show cluster [configuration|members|status]
```

### Parameters

- `show cluster [configuration|members {detail}|status]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cluster</td>
<td>Displays cluster information</td>
</tr>
<tr>
<td>configuration</td>
<td>Displays cluster configuration parameters</td>
</tr>
<tr>
<td>members {detail}</td>
<td>Displays cluster members configured on the logged device</td>
</tr>
<tr>
<td>status</td>
<td>Displays cluster status</td>
</tr>
<tr>
<td>detail</td>
<td>Optional. Displays detailed information of known cluster members</td>
</tr>
</tbody>
</table>

### Examples

```
rfs6000-380649(config)#show cluster configuration

Cluster Configuration Information
Name : SiteConRFS6k
Configured Mode : Active
Master Priority : 128
Force configured state : Disabled
Force configured state delay : 5 minutes
Handle STP : Disabled
Radius Counter DB Sync Time : 5 minutes
```

```
rfs6000-380649(config)#show cluster members detail

<table>
<thead>
<tr>
<th>ID</th>
<th>MAC</th>
<th>Mode</th>
<th>AP Count</th>
<th>AAP Count</th>
<th>AP License</th>
<th>AAP License</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>70.38.06.49</td>
<td>00-15-70-38-06-49</td>
<td>Active</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5.8.4.0-008D</td>
</tr>
<tr>
<td>70.81.74.2D</td>
<td>00-15-70-81-74-2D</td>
<td>Active</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>5.8.4.0-008D</td>
</tr>
</tbody>
</table>
```

```
rfs6000-380649(config)#show cluster status

Cluster Runtime Information
Protocol version : 1
Cluster operational state : active
AP license : 1
AAP license : 0
AP count : 0
AAP count : 1
Max AP adoption capacity : 256
Number of connected member(s) : 1
```

```
rfs6000-380649(config)#
```
### 6.1.12 `cmp-factory-certs`

- **show commands**

  Displays factory installed CMP certificates

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show cmp-factory-certs {all}
```

**Parameters**

- `cmp-factory-certs {all}`

<table>
<thead>
<tr>
<th><strong>cmp-factory-certs</strong> {all}</th>
<th>Displays factory installed CMP certificates on the logged device. Optionally use the 'all' keyword to view certificate details.</th>
</tr>
</thead>
</table>

**Examples**

```
nx9500-6C8809>show cmp-factory-certs
No CMP factory certificate exist
nx9500-6C8809>
```
6.1.13 commands

- **show commands**

Displays commands available for the current mode

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show commands
```

**Parameters**

None

**Examples**

```
rfs4000-229D58(config)#show commands
help
help search WORD ([detailed|only-show|skip-show|skip-no)
show commands
show adoption log adoptee([on DEVICE-NAME])
show adoption log adopter ([mac AA-BB-CC-DD-EE-FF] [on DEVICE-NAME])
show adoption info ([on DEVICE-NAME])
show adoption status ([on DEVICE-NAME])
show adoption config-errors DEVICE-NAME
show adoption offline
show adoption pending ([on DEVICE-NAME])
show adoption history ([on DEVICE-NAME])
show debugging ([on DEVICE-OR-DOMAIN-NAME])
show debugging cfgd
show debugging fib([on DEVICE-NAME])
show debugging adoption ([on DEVICE-OR-DOMAIN-NAME])
show debugging wireless ([on DEVICE-OR-DOMAIN-NAME])
show debugging snmp ([on DEVICE-NAME])
show debugging ssm ([on DEVICE-NAME])
show debugging voice ([on DEVICE-OR-DOMAIN-NAME])
show debugging captive-portal ([on DEVICE-OR-DOMAIN-NAME])
show debugging dhcpsvr ([on DEVICE-NAME])
show debugging role ([on DEVICE-OR-DOMAIN-NAME])
show debugging dottedx([on DEVICE-NAME])
```

--More--

```
rfs4000-229D58(config)#
```

```
x4500-5CFA2B(config)#show commands
help
help search WORD ([detailed|only-show|skip-show|skip-no)
show commands
show adoption log adoptee([on DEVICE-NAME])
show adoption log adopter ([mac AA-BB-CC-DD-EE-FF] [on DEVICE-NAME])
show adoption info ([on DEVICE-NAME])
show adoption status ([on DEVICE-NAME])
show adoption config-errors DEVICE-NAME
show adoption offline
show adoption pending ([on DEVICE-NAME])
show adoption history ([on DEVICE-NAME])
show debugging ([on DEVICE-OR-DOMAIN-NAME])
show debugging cfgd
```

--More--

```
x4500-5CFA2B(config)#
```
### 6.1.14 context

» show commands

Displays the current context details

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show context \{include-factory|session-config \{include-factory\}\}
```

**Parameters**

- `include-factory` — Optional. Includes factory defaults
- `session-config \{include-factory\}` — Optional. Displays running system information in the current context

- **include-factory** — Optional. Includes factory defaults

**Examples**

```
rfs4000-229D58(config)#show context
!
! Configuration of RFS4000 version 5.8.4.0-008D
!
!
version 2.5
!
client-identity Android-2-2
  dhcp 1 message-type request option 55 exact hexstring 01792103061c333a3b
  dhcp 6 message-type request option 60 exact ascii "dhcpcd 4.0.15"
!
client-identity Android-2-3
  dhcp 3 message-type request option 55 exact hexstring 01792103061c333a3b
  dhcp 6 message-type request option 60 exact ascii "dhcpcd 4.0.15"
  dhcp 1 message-type request option-codes exact hexstring 353d32393c37
  dhcp 2 message-type request option-codes exact hexstring 353d3236393c37
  dhcp 10 message-type request option-codes exact hexstring 353d3236393c0c37
!
client-identity Android-2-3-x
  dhcp 10 message-type request option 55 exact hexstring 01792103060f1c333a3b77
  dhcp 11 message-type request option 55 exact hexstring 01792103060f1c2c333a3b77
  dhcp 12 message-type request option 60 exact ascii "dhcpcd 4.0.15"
!
--More--
rfs4000-229D58(config)#
```
6.1.15 critical-resources

> show commands

Displays critical resource information. Critical resources are resources vital to the network.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
show critical-resources {on <DEVICE-NAME>}
```

Parameters

- `critical-resources` Displays critical resources information
- `on <DEVICE-NAME>` Optional. Displays critical resource information on a specified device

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>critical-resources</td>
<td>Displays critical resources information</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays critical resource information on a specified device</td>
</tr>
</tbody>
</table>

Examples

```
rfs4000-229D58(config)#show critical-resources
-----------------------------------------------------------
<table>
<thead>
<tr>
<th>CRITICAL_RESOURCE IP</th>
<th>VLAN</th>
<th>PING-MODE</th>
<th>STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.168.1.103</td>
<td>1</td>
<td>arp-icmp</td>
<td>up</td>
</tr>
</tbody>
</table>
-----------------------------------------------------------
rfs4000-229D58(config)#
```
## 6.1.16 crypto

### show commands

Displays encryption mode information

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

- `show crypto [cmp|ike|ipsec|key|pki]`
- `show crypto cmp request status`
- `show crypto ike sa {detail|on|peer|version} {on <DEVICE-NAME>}`
- `show crypto ike sa {version [1|2]} {peer <IP>} {on <DEVICE-NAME>}`
- `show crypto ipsec sa {detail|on|peer} {on <DEVICE-NAME>}`
- `show crypto ipsec sa {version [1|2]} {peer <IP>} {on <DEVICE-NAME>}`
- `show crypto key rsa {on|public-key-detail} {on <DEVICE-NAME>}`
- `show crypto key rsa {public-key-detail} {on <DEVICE-NAME>}`
- `show crypto pki trustpoints {<TRUSTPOINT-NAME>|all|on} {on <DEVICE-NAME>}`
- `show crypto pki trustpoints {<TRUSTPOINT-NAME>|all} {on <DEVICE-NAME>}`

### Parameters

- **crypto cmp request status**
  - Displays current status of in-progress certificate management protocol (CMP) requests
  - **Note:** For more information, see `CRYPTO-CMP-POLICY`.

- **show crypto ike sa {detail|on|peer|version} {on <DEVICE-NAME>}**
  - Displays Internet Key Exchange (IKE) security association (SA) statistics
  - **detail**
  - Displays detailed IKE SA statistics
  - **peer <IP>**
  - Optional. Displays IKE SA statistics for a specified peer
  - <IP> – Specify the peer’s IP address in the A.B.C.D format
  - **on <DEVICE-NAME>**
  - Optional. Displays IKE SA statistics on a specified device
  - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

- **show crypto ike sa {version [1|2]} {peer <IP>} {on <DEVICE-NAME>}**
  - Displays IKE SA details
  - **version [1|2]**
  - Optional. Displays IKE SA version statistics
  - 1 – Displays IKEv1 statistics
  - 2 – Displays IKEv2 statistics
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show crypto ipsec sa</code></td>
<td>Displays Internet Protocol Security (IPSec) SA statistics. The IPSec encryption authenticates and encrypts each IP packet in a communication session.</td>
</tr>
<tr>
<td><code>peer &lt;IP&gt;</code></td>
<td>Optional. Displays IKE SA version statistics for a specified peer. &lt;IP&gt; – Specify the peer’s IP address in the A.B.C.D format.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>The following keyword is recursive and common to the ‘peer ip’ parameter: &lt;DEVICE-NAME&gt; – Optional. Displays IKE SA statistics on a specified device. &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td><code>detail</code></td>
<td>Optional. Displays detailed IPSec SA statistics.</td>
</tr>
<tr>
<td><code>crypto ipsec sa detail</code></td>
<td>Optional. Displays IPSec SA statistics for a specified peer. &lt;IP&gt; – Specify the peer’s IP address in the A.B.C.D format. detail – Displays detailed IPSec SA statistics for the specified peer</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Displays IPSec SAs on a specified device. &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

**Note:**
- This command displays all trustpoints including CMP-generated trustpoints.
- The following keyword is recursive:
  - <TRUSTPOINT-NAME> – Specify the trustpoint name.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>crypto key rsa</code></td>
<td>Displays RSA public keys.</td>
</tr>
<tr>
<td><code>public-key-detail</code></td>
<td>Optional. Displays public key in the Privacy-Enhanced Mail (PEM) format.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>The following keyword is recursive: &lt;DEVICE-NAME&gt; – Optional. Displays public key on a specified device. &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>crypto pki trustpoints</code></td>
<td>Displays WLAN trustpoints. <strong>Note:</strong> This command displays all trustpoints including CMP-generated trustpoints.</td>
</tr>
<tr>
<td><code>&lt;TRUSTPOINT-NAME&gt;</code></td>
<td>Optional. Displays a specified trustpoint details. Specify the trustpoint name.</td>
</tr>
<tr>
<td><code>all</code></td>
<td>Optional. Displays details of all trustpoints.</td>
</tr>
</tbody>
</table>
Examples

nx9500-6C8809(config)#show crypto key rsa public-key-detail

RSA key name: ting       Key-length: 2048
-----BEGIN PUBLIC KEY-----
MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCQxuebasvAAt1jRY3+/mcInGrlrw
3DaasuTlJhKsW7gk5kVbM7RLd/Wq/mPZEgwpFlnvFIm4rVIke+mVdWBqV4oGE1TUm
Z4YqKtzIANSAG7EZREr3MXEIHd49NHYeK8U+1EAmHN9F21XCxTO+yRMngKDJeHz
Za2/64PbSnR1V4nCGM0HbbaaCwGe5X0a
-----END PUBLIC KEY-----

RSA key name: default_rsa_key       Key-length: 2048
-----BEGIN PUBLIC KEY-----
MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCQxuebasvAAt1jRY3+/mcInGrlrw
3DaasuTlJhKsW7gk5kVbM7RLd/Wq/mPZEgwpFlnvFIm4rVIke+mVdWBqV4oGE1TUm
Z4YqKtzIANSAG7EZREr3MXEIHd49NHYeK8U+1EAmHN9F21XCxTO+yRMngKDJeHz
Za2/64PbSnR1V4nCGM0HbbaaCwGe5X0a
-----END PUBLIC KEY-----

nx9500-6C8809(config)#show crypto key rsa

#                KEY NAME               KEY LENGTH
----------  -----------------  --------
1            ting                2048
2            default_rsa_key     2048

nx9500-6C8809(config)#show crypto pki trustpoints all

Trustpoint Name: default-trustpoint (self signed)

CRL present: no
Server Certificate details:
  Key used: default_rsa_key
  Serial Number: 051d
  Subject Name: /CN=NX9500-B4-C7-99-6C-88-09
  Issuer Name: /CN=NX9500-B4-C7-99-6C-88-09
  Valid From : Thu Dec 5 04:15:59 2013 UTC
  Valid Until: Sun Dec 3 04:15:59 2023 UTC

nx9500-6C8809(config)#

nx9500-6C8809>show crypto cmp request status
CMP Request Status: ir-req-reset
nx9500-6C8809>
### 6.1.17 database

- **show commands**
  
  Displays database-related statistics and status

  Supported in the following platforms:

  - Service Platforms — NX9000, NX9500, NX9510

**Syntax**

```
show database [statistics|status] {on <DEVICE-NAME>}
```

**Parameters**

- **show database [statistics|status] {on <DEVICE-NAME>}**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>database</td>
<td>Displays database-related statistics and status</td>
</tr>
<tr>
<td>statistics</td>
<td>Displays database-related statistics, such as name of the database (NSight or captive portal), data size, storage size, free disk space available, etc.</td>
</tr>
<tr>
<td>status</td>
<td>Displays database status, such as online time.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays database-related information on a specified device</td>
</tr>
</tbody>
</table>

- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

**Examples**

```
nx9500-6C8809#show database status
--------------------------------------------------------------------------------
MEMBER             STATE                     ONLINE TIME
--------------------------------------------------------------------------------
localhost           PRIMARY           3 days 22 hours 1 min 44 sec
--------------------------------------------------------------------------------
[*] indicates this device.
nx9500-6C8809#
```

```
nx9500-6C8809#show database statistics
--------------------------------------------------------------------------------
DATABASE        STORAGE SIZE   DATA SIZE     INDEX SIZE     DISK FREE
--------------------------------------------------------------------------------
n sight       2.5M            11.5M        2.8M          595.0G
captive_portal 4k              0            24k           595.0G
nsightcache     44k             130          96k           595.0G
--------------------------------------------------------------------------------
nx9500-6C8809#
```
### 6.1.18 device-upgrade

#### show commands

Displays device firmware upgradation information for devices adopted by a wireless controller or access point

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

- **show device-upgrade** [history|load-image-status|status|versions]
- **show device-upgrade** [history {on <DOMAIN-NAME>}|load-image-status] versions {on <DEVICE-OR-DOMAIN-NAME>}
- **show device-upgrade status** {on [<DOMAIN-NAME>|rf-domain-manager]} summary {on <DOMAIN-NAME>}

#### Parameters

- **show device-upgrade** [history {on <DOMAIN-NAME>}|load-image-status|versions {on <DEVICE-OR-DOMAIN-NAME>}] status

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>device-upgrade</strong></td>
<td>Displays device upgrade information based on the parameters passed</td>
</tr>
<tr>
<td><strong>history</strong> {on &lt;DOMAIN-NAME&gt;}</td>
<td>Displays device upgrade history</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DOMAIN-NAME&gt; – Optional. Displays upgrade history for all devices within a specified RF Domain. Specify the RF Domain name.</td>
</tr>
<tr>
<td><strong>load-image-status</strong></td>
<td>Displays firmware image loading status. The output displays the &lt;DEVICE&gt; image loading status in percentage.</td>
</tr>
<tr>
<td></td>
<td>For example:</td>
</tr>
<tr>
<td></td>
<td>#show device-upgrade load-image-status</td>
</tr>
<tr>
<td></td>
<td>Download of ap81xx firmware file is 47 percent complete</td>
</tr>
<tr>
<td><strong>versions</strong> {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>Displays firmware image versions</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays firmware image versions loaded on specified device or RF Domain. Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
<tr>
<td><strong>device-upgrade status</strong> {on [&lt;DOMAIN-NAME&gt;</td>
<td>rf-domain-manager]} summary {on &lt;DOMAIN-NAME&gt;}]</td>
</tr>
<tr>
<td><strong>status</strong></td>
<td>Displays in progress device upgrade status</td>
</tr>
<tr>
<td>on [&lt;DOMAIN-NAME&gt;</td>
<td>rf-domain-manager]</td>
</tr>
<tr>
<td></td>
<td>• &lt;DOMAIN-NAME&gt; – Specify the RF Domain name.</td>
</tr>
<tr>
<td></td>
<td>• rf-domain-manager – Select to view devices upgraded by the RF Domain manager.</td>
</tr>
</tbody>
</table>
Examples

```
rfs7000-37FABE#show device-upgrade versions
--------------------------------------------------------------------------------
CONTROLLER              DEVICE-TYPE                 VERSION
--------------------------------------------------------------------------------
 rfs7000-6DCD4B              ap621                  5.8.4.0-008D
 rfs7000-6DCD4B              ap622                  5.8.4.0-008D
 rfs7000-6DCD4B              ap650                  5.8.4.0-008D
 rfs7000-6DCD4B              ap6511                 none
 rfs7000-6DCD4B              ap6521                 5.8.4.0-008D
 rfs7000-6DCD4B              ap6522                 5.8.4.0-008D
 rfs7000-6DCD4B              ap6532                 5.8.4.0-008D
 rfs7000-6DCD4B              ap6562                 5.8.4.0-008D
 rfs7000-6DCD4B              ap71xx                 none
 rfs7000-6DCD4B              ap7502                 none
 rfs7000-6DCD4B              ap7522                 none
 rfs7000-6DCD4B              ap7532                 none
 rfs7000-6DCD4B              ap7562                 none
 rfs7000-6DCD4B              ap81xx                 5.8.4.0-008D
 rfs7000-6DCD4B              ap82xx                 none
 rfs7000-6DCD4B              ap8432                 none
 rfs7000-6DCD4B              ap8533                 none
 rfs7000-6DCD4B              rfs4000                none
 rfs7000-6DCD4B              rfs6000                5.8.4.0-008D
 rfs7000-6DCD4B              rfs7000                none
--------------------------------------------------------------------------------
rfs7000-37FABE#
```

```
rfs7000-37FABE#device-upgrade load-image rfs6000 ftp://anonymous:anonymous@192.168.13.10/LatestBuilds/W584/RFS6000-LEAN-5.8.4.0-008D.img
```

```
rfs7000-37FABE#show device-upgrade versions
--------------------------------------------------------------------------------
CONTROLLER              DEVICE-TYPE                 VERSION
--------------------------------------------------------------------------------
 rfs7000-6DCD4B              ap621                  5.8.4.0-008D
 rfs7000-6DCD4B              ap622                  5.8.4.0-008D
 rfs7000-6DCD4B              ap650                  5.8.4.0-008D
 rfs7000-6DCD4B              ap6511                 none
 rfs7000-6DCD4B              ap6521                 5.8.4.0-008D
 rfs7000-6DCD4B              ap6522                 5.8.4.0-008D
 rfs7000-6DCD4B              ap6532                 5.8.4.0-008D
 rfs7000-6DCD4B              ap6562                 5.8.4.0-008D
 rfs7000-6DCD4B              ap71xx                 none
 rfs7000-6DCD4B              ap7502                 none
 rfs7000-6DCD4B              ap7522                 none
 rfs7000-6DCD4B              ap7532                 none
 rfs7000-6DCD4B              ap7562                 none
 rfs7000-6DCD4B              ap81xx                 5.8.4.0-008D
 rfs7000-6DCD4B              ap82xx                 none
 rfs7000-6DCD4B              ap8432                 none
 rfs7000-6DCD4B              ap8533                 none
 rfs7000-6DCD4B              rfs4000                none
 rfs7000-6DCD4B              rfs6000                5.8.4.0-008D
 rfs7000-6DCD4B              rfs7000                none
--------------------------------------------------------------------------------
rfs7000-37FABE#
```
rfs7000-37FABE# show device-upgrade status
Number of devices currently being upgraded : 1
Number of devices waiting in queue to be upgraded : 0
Number of devices currently being rebooted : 0
Number of devices waiting in queue to be rebooted : 0
Number of devices failed upgrade : 0

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>STATE</th>
<th>UPGRADE TIME</th>
<th>REBOOT TIME</th>
<th>PROGRESS</th>
<th>RETRIES</th>
<th>LAST UPDATE</th>
<th>ERROR</th>
<th>UPGRADED BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs6000-81742D</td>
<td>downloading</td>
<td>immediate</td>
<td>immediate</td>
<td>43</td>
<td>0</td>
<td>-</td>
<td></td>
<td>rfs7000-37FABE</td>
</tr>
</tbody>
</table>

rfs7000-37FABE#

rfs7000-37FABE# show device-upgrade status
Number of devices currently being upgraded : 0
Number of devices waiting in queue to be upgraded : 0
Number of devices currently being rebooted : 1
Number of devices waiting in queue to be rebooted : 0
Number of devices failed upgrade : 0

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>STATE</th>
<th>UPGRADE TIME</th>
<th>REBOOT TIME</th>
<th>PROGRESS</th>
<th>RETRIES</th>
<th>LAST UPDATE</th>
<th>ERROR</th>
<th>UPGRADED BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs6000-81742D</td>
<td>rebooting</td>
<td>immediate</td>
<td>immediate</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td></td>
<td>rfs7000-37FABE</td>
</tr>
</tbody>
</table>

rfs7000-37FABE#

rfs7000-37FABE# show device-upgrade history

<table>
<thead>
<tr>
<th>Device</th>
<th>RESULT</th>
<th>TIME</th>
<th>RETRIES</th>
<th>UPGRADED-BY</th>
<th>LAST-UPDATE-ERROR</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs6000-81742D</td>
<td>done</td>
<td>2016-02-04 03:37:11</td>
<td>0</td>
<td>rfs7000-37FABE</td>
<td>-</td>
</tr>
<tr>
<td>rfs6000-81742D</td>
<td>done</td>
<td>2015-01-05 05:35:53</td>
<td>0</td>
<td>rfs7000-37FABE</td>
<td>-</td>
</tr>
<tr>
<td>rfs6000-81742D</td>
<td>failed</td>
<td>2014-09-28 23:25:45</td>
<td>3</td>
<td>rfs7000-37FABE</td>
<td>Reboot failed</td>
</tr>
<tr>
<td>rfs6000-81742D</td>
<td>done</td>
<td>2014-11-30 21:54:11</td>
<td>0</td>
<td>rfs7000-37FABE</td>
<td>-</td>
</tr>
<tr>
<td>rfs6000-81742D</td>
<td>done</td>
<td>2015-04-16 06:40:14</td>
<td>0</td>
<td>rfs7000-37FABE</td>
<td>-</td>
</tr>
<tr>
<td>rfs6000-81742D</td>
<td>done</td>
<td>2014-09-14 23:33:08</td>
<td>0</td>
<td>rfs7000-37FABE</td>
<td>-</td>
</tr>
</tbody>
</table>

--More--

rfs7000-37FABE#
6.1.19 **dot1x**

*show commands*

Displays dot1x information on interfaces

Dot1x (or 802.1x) is an IEEE standard for network authentication. Devices supporting dot1x allow the automatic provision and connection to the wireless network without launching a Web browser at login. When within range of a dot1x network, a device automatically connects and authenticates without needing to manually login.

Supported in the following platforms:

- Access Points — AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP81XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

```plaintext
show dot1x [all {on <DEVICE-NAME>} | interface [〈INTERFACE-NAME〉|ge 〈1-4〉|port-channel 〈1-2〉] {on <DEVICE-NAME>]
```

**Parameters**

- **show dot1x [all {on <DEVICE-NAME>} | interface [〈INTERFACE-NAME〉|ge 〈1-4〉|port-channel 〈1-2〉] {on <DEVICE-NAME>]}**

<table>
<thead>
<tr>
<th>dot1x all</th>
<th>Optional. Displays dot1x information for all interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays dot1x information for all interfaces on a specified device</td>
</tr>
<tr>
<td>〈INTERFACE-NAME〉</td>
<td>Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>dot1x</th>
<th>Optional. Displays dot1x information for interfaces on a specified device</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Specify the name of AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

**NOTE:** Dot.1x supplicant configuration is supported on the following platforms:

- Access Points – AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX6524

**NOTE:** Dot.1x authenticator configuration is supported on the following platforms:

- Access Points – ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX4524, NX6500, NX6524

**dot1x all**

Optional. Displays dot1x information for all interfaces

- on <DEVICE-NAME> — Optional. Displays dot1x information for all interfaces on a specified device
- 〈INTERFACE-NAME〉 — Specify the name of the AP, wireless controller, or service platform.

**dot1x**

Optional. Displays dot1x information for interfaces on a specified device

- <DEVICE-NAME> — Specify the name of AP, wireless controller, or service platform.

- show dot1x {interface [〈INTERFACE-NAME〉|ge 〈1-4〉|port-channel 〈1-2〉] {on <DEVICE-NAME>}}

**dot1x interface**

Optional. Displays dot1x information for a specified interface or interface type

- <INTERFACE-NAME> — Displays dot1x information for the layer 2 (Ethernet port) interface specified by the 〈INTERFACE-NAME〉 parameter
| ge <1-4> | Displays dot1x for a specified GigabitEthernet interface  
|          | • <1-4> – Select the interface index from 1 - 4. |
| port-channel <1-2> | Displays dot1x for a specified port channel interface  
|          | • <1-2> – Select the interface index from 1 - 2. |
| on <DEVICE-NAME> | The following keywords are common to all of the above parameters:  
|          | • on <DEVICE-NAME> – Optional. Displays dot1x interface information on a specified device  
|          | • <DEVICE-NAME> – Specify the name of AP, wireless controller, or service platform. |

**Examples**

rfs7000-37FABE(config)#show dot1x all  
SysAuthControl is disabled  
Guest-Vlan is disabled  
AAA-Policy is none  

Dot1x info for interface GE1  
-----------------------------------  
Supplicant MAC N/A  
Auth SM State = FORCE AUTHORIZED  
Bend SM State = REQUEST  
Port Status = AUTHORIZED  
Host Mode = SINGLE  
Auth Vlan = None  
Guest Vlan = None  

Dot1x info for interface GE2  
-----------------------------------  
Supplicant MAC N/A  
Auth SM State = FORCE AUTHORIZED  
Bend SM State = REQUEST  
Port Status = AUTHORIZED  
Host Mode = SINGLE  
Auth Vlan = None  
Guest Vlan = None  
--More--  
rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show dot1x interface ge 3  
Dot1x info for interface GE3  
-----------------------------------  
Supplicant MAC N/A  
Auth SM State = FORCE AUTHORIZED  
Bend SM State = REQUEST  
Port Status = AUTHORIZED  
Host Mode = SINGLE  
Auth Vlan = None  
Guest Vlan = None  

rfs7000-37FABE(config)#
6.1.20 dpi

Displays Deep Packet Inspection (DPI) statistics for all configured and canned applications. DPI is an advanced packet filtering technique functioning at the application layer. Use DPI to find, identify, classify, reroute or block packets containing specific data or codes that other packet filtering techniques (examining only packet headers) cannot detect.

RF Domain member devices inspect every byte of each application header packet allowed to pass through the WiNG managed network. When an application is recognized and classified by the WiNG application recognition engine, administrator defined actions can be applied to that specific application.

NOTE: The show > dpi command returns results only if executed on a device that supports DPI and has DPI logging enabled. DPI logging can be enabled either on the device or on the profile applied to the device. For more information, see dpi.

Supported in the following platforms:
- Access Points — AP7522, AP7532, AP7562
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show dpi [app|app-category|application|application-policy|per-category]

show dpi app wireless-clients stats <MAC> {on <DEVICE-OR-DOMAIN-NAME>}

show dpi [app|app-category] stats [<APPLICATION/APP-CATEGORY-NAME>|all] {on <DEVICE-OR-DOMAIN-NAME>}

show dpi application-policy stats <APPLICATION-POLICY-NAME> {on <DEVICE-OR-DOMAIN-NAME>}

show dpi application brief

show dpi per-category stats <APP-CATEGORIES> [bytes-in|bytes-out|total-bytes] {on <DEVICE-OR-DOMAIN-NAME>}

Parameters
- show dpi app wireless-clients stats <MAC> {<DEVICE-OR-DOMAIN-NAME>}

| dpi app wireless-clients <MAC> | Displays application-related statistics for all or a specified wireless clients
|-----------------------------|----------------------------------------------------------------------------------
| on <DEVICE-OR-DOMAIN-NAME> | Optional. Displays statistical data on a specified device or RF Domain
| <MAC> – Displays statistics for a specified wireless client. Specify the client's MAC address.
| <DEVICE-OR-DOMAIN-NAME> – Specify the name of the access point, wireless controller, service platform, or RF Domain.
### SHOW COMMANDS

- `show dpi [app|app-category] stats [<APPLICATION/APP-CATEGORY-NAME>|all] {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>dpi [app] app-category stats</th>
<th>Displays statistics for an application or application category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• app – Displays statistics for a specified application or all applications</td>
</tr>
<tr>
<td></td>
<td>• app-category – Displays statistics for a specified application category or all categories.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>The applications are the RF Domain member allowed applications whose data (bytes) are passing through the WING managed network. And, the application categories are existing WING or user defined application groups (video, streaming, mobile, audio, etc.) that assist administrators to permit or deny forwarding of application data.</td>
</tr>
<tr>
<td>[&lt;APPLICATION/APP-CATEGORY-NAME&gt;</td>
<td>all]</td>
</tr>
<tr>
<td></td>
<td>• &lt;APPLICATION/APP-CATEGORY-NAME&gt; – Displays statistics for a specified application or application category, depending on the option selected in the previous step. Specify the application name or application category name.</td>
</tr>
<tr>
<td></td>
<td>• all – Displays statistics for all application or application category, depending on the option selected in the previous step</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Displays statistical data on a specified device or RF Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the access point, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

- `show dpi application-policy stats <APPLICATION-POLICY-NAME> {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>dpi application-policy stats</th>
<th>Displays statistics for an existing application policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;APPLICATION-POLICY-NAME&gt;</td>
<td>Displays statistics for a specified application-policy. Specify the application-policy name.</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Displays application-policy related statistical data on a specified device or RF Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the access point, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

- `show dpi application brief`

| dpi application brief | Displays a brief summary of applications their status and configuration |

- `show dpi per-category stats <APP-CATEGORIES> [bytes-in|bytes-out|total-bytes] {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>dpi per-category stats</th>
<th>Displays statistics for the top ten applications based on the application category and the Sort ID specified. The Sort ID options are: bytes-in, bytes-out or total-bytes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;APP-CATEGORIES&gt;</td>
<td>Specify the application category name. The system displays statistics for the top ten applications in this category.</td>
</tr>
</tbody>
</table>
### Examples

```
nx9500-6C8809>show dpi application brief
  1-clickshare-com
    This application recognizes DirectDownloadLink 1-clickshare traffic
    Application Category : filetransfer
    Predefined Application : Yes

  1-upload-com
    This application recognizes DirectDownloadLink 1-upload-com traffic
    Application Category : filetransfer
    Predefined Application : Yes

  1-upload-to
    This application recognizes DirectDownloadLink 1-upload-to traffic
    Application Category : filetransfer
    Predefined Application : Yes

  10upload-com
    This application recognizes DirectDownloadLink 10upload-com traffic
    Application Category : filetransfer
    Predefined Application : Yes

  123upload-pl
    This application recognizes DirectDownloadLink 123upload-pl traffic

--More--
nx9500-6C8809>
```
6.1.21 environmental-sensor

Displays environmental sensor’s recorded data. The environmental sensor has to be enabled and configured in order to collect data related to humidity, light, motion, and temperature.

For more information on enabling and configuring environmental sensor settings, see .

**NOTE:** The environmental sensor is supported only on an AP8132. When executed on any controller (other than an AP8132), the show > environmental-sensor > <parameters> command displays environmental-sensor details for adopted AP8132s (if any).

Supported in the following platforms:
- Access Points — AP8132

**Syntax**
```
show environmental-sensor
```

```
show environmental-sensor history {<1-HOUR>|<20-MINUTE>|<24-HOUR>}
```

```
show environmental-sensor [humidity|light|motion|summary|temperature|version]
```

**Parameters**
- **show environmental-sensor history {<1-HOUR>|<20-MINUTE>|<24-HOUR>}**

<table>
<thead>
<tr>
<th>environmental-sensor history</th>
<th>Displays environmental sensor history once in every hour, 20 minutes, or 24 hours</th>
</tr>
</thead>
</table>
| Note: History includes the humidity, light, motion, and temperature data recorded by the sensor at specified time interval.

| 1-hour | Optional. Displays environmental sensor history once in every 1 (one) hour |
| 20-minute | Optional. Displays environmental sensor history once in every 20 minutes |
| 24-hour | Optional. Displays environmental sensor history once in every 24 hours |

- **show environmental-sensor [humidity|light|motion|summary|temperature|version]**

<table>
<thead>
<tr>
<th>environmental-sensor</th>
<th>Displays environmental sensor’s recorded data, based on the parameters passed. The system displays the specified recorded data.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: The environmental sensor records data at the following intervals: 20 minutes, 1 hour, and 24 hours.</td>
<td></td>
</tr>
</tbody>
</table>

| humidity | Displays the minimum, average, and maximum humidity recorded |
| light | Displays the minimum, average, and maximum light recorded |
| motion | Displays the minimum, average, and maximum motion recorded |
| temperature | Displays the minimum, average, and maximum temperature recorded |
| version | Displays the hardware and firmware versions |
| summary | Displays a summary of the data recorded at following intervals: |
Examples

ap8132-711728#show environmental-sensor summary
Maat Device uptime: 0 days 15:25:11
ERROR: Maat device is offline!
threshold polling-interval: 5
historical data polled 0 times per 2-minutes interval since Maat online

motion-sensor: Enabled(Demo)
current value: 0 detected
---------------------------------------------------------
motion detected
---------------------------------------------------------
20-minute 0
1-hour 0
6-hour 0
24-hour 0

temperature-sensor: Enabled(Demo)
current value: -40.00 deg. C
---------------------------------------------------------
min/average/max
---------------------------------------------------------
20-minute 0/0/0
1-hour 0/0/0
6-hour 0/0/0
24-hour 0/0/0

light-sensor: Enabled
threshold-high:+400.00 threshold-low:+200.00 holdtime:11
action radio-shutdown: radio-1 and radio-2
light-on:1
light-on/off event sent:0/0
current value: 0.00 lux
---------------------------------------------------------
min/average/max
---------------------------------------------------------
20-minute 0/0/0
1-hour 0/0/0
6-hour 0/0/0
24-hour 0/0/0

humidity-sensor: Enabled(Demo)
current value: 0.00 %
---------------------------------------------------------
min/average/max
---------------------------------------------------------
20-minute 0/0/0
1-hour 0/0/0
6-hour 0/0/0
24-hour 0/0/0

ap8132-711728#

ap8132-711728#show env-sensor history
Current Time: 2015-06-20 14:08:01 UTC
-------------------------------------------------------------------------------
Sample-Interval          Motion    Temperature     Light       Humidity
                         (deg. C)      (lux)         (%)
----------- min/average/max ----------------- 
-------------------------------------------------------------------------------
20-minute                       1         64/65/66      77/80        58/60/61
1-hour                          24        63/67/70      75/81        57/59/61
6-hour                          128       60/62/69      71/79        52/56/71
24-hour                         188       54/58/70      15/45        49/57/73

ap8132-711634#
**SHOW COMMANDS 6-47**

ap8132-711634#show env-sensor history 20-min

<table>
<thead>
<tr>
<th>timestamp</th>
<th>Motion</th>
<th>Temperature</th>
<th>Light</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-11-20 13:51:35 UTC</td>
<td>0</td>
<td>66</td>
<td>79</td>
<td>59</td>
</tr>
<tr>
<td>2015-11-20 13:53:35 UTC</td>
<td>0</td>
<td>66</td>
<td>79</td>
<td>59</td>
</tr>
<tr>
<td>2015-11-20 13:55:35 UTC</td>
<td>0</td>
<td>65</td>
<td>79</td>
<td>58</td>
</tr>
<tr>
<td>2015-11-20 13:57:35 UTC</td>
<td>1</td>
<td>66</td>
<td>80</td>
<td>59</td>
</tr>
<tr>
<td>2015-11-20 13:59:35 UTC</td>
<td>0</td>
<td>66</td>
<td>79</td>
<td>59</td>
</tr>
<tr>
<td>2015-11-20 14:02:35 UTC</td>
<td>0</td>
<td>65</td>
<td>79</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 14:03:35 UTC</td>
<td>0</td>
<td>64</td>
<td>79</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 14:05:35 UTC</td>
<td>2</td>
<td>66</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 14:07:35 UTC</td>
<td>0</td>
<td>66</td>
<td>80</td>
<td>61</td>
</tr>
<tr>
<td>2015-11-20 14:09:35 UTC</td>
<td>0</td>
<td>66</td>
<td>80</td>
<td>61</td>
</tr>
</tbody>
</table>

ap8132-711634#show env-sensor history 1-hr

<table>
<thead>
<tr>
<th>timestamp</th>
<th>Motion</th>
<th>Temperature</th>
<th>Light</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-11-20 13:51:35 UTC</td>
<td>0</td>
<td>66</td>
<td>79</td>
<td>59</td>
</tr>
<tr>
<td>2015-11-20 13:53:35 UTC</td>
<td>0</td>
<td>66</td>
<td>79</td>
<td>59</td>
</tr>
<tr>
<td>2015-11-20 13:55:35 UTC</td>
<td>0</td>
<td>65</td>
<td>79</td>
<td>58</td>
</tr>
<tr>
<td>2015-11-20 13:57:35 UTC</td>
<td>1</td>
<td>66</td>
<td>80</td>
<td>59</td>
</tr>
<tr>
<td>2015-11-20 14:01:35 UTC</td>
<td>0</td>
<td>65</td>
<td>79</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 14:03:35 UTC</td>
<td>0</td>
<td>64</td>
<td>79</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 14:05:35 UTC</td>
<td>2</td>
<td>66</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 14:07:35 UTC</td>
<td>0</td>
<td>66</td>
<td>80</td>
<td>61</td>
</tr>
<tr>
<td>2015-11-20 14:09:35 UTC</td>
<td>0</td>
<td>66</td>
<td>80</td>
<td>61</td>
</tr>
<tr>
<td>2015-11-20 14:42:35 UTC</td>
<td>0</td>
<td>65</td>
<td>81</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 14:43:35 UTC</td>
<td>0</td>
<td>64</td>
<td>80</td>
<td>59</td>
</tr>
<tr>
<td>2015-11-20 14:45:35 UTC</td>
<td>3</td>
<td>66</td>
<td>80</td>
<td>60</td>
</tr>
</tbody>
</table>

<DEVICE-NAME>#show env-sensor history 24-hr

<table>
<thead>
<tr>
<th>timestamp</th>
<th>Motion</th>
<th>Temperature</th>
<th>Light</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-11-20 10:10:20 UTC</td>
<td>27</td>
<td>66</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 10:30:20 UTC</td>
<td>17</td>
<td>66</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 10:50:20 UTC</td>
<td>17</td>
<td>66</td>
<td>81</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 11:10:20 UTC</td>
<td>25</td>
<td>66</td>
<td>81</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 11:30:20 UTC</td>
<td>24</td>
<td>66</td>
<td>81</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-20 11:50:20 UTC</td>
<td>26</td>
<td>66</td>
<td>81</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-21 08:10:20 UTC</td>
<td>9</td>
<td>65</td>
<td>80</td>
<td>59</td>
</tr>
<tr>
<td>2015-11-21 08:30:20 UTC</td>
<td>7</td>
<td>65</td>
<td>80</td>
<td>59</td>
</tr>
<tr>
<td>2015-11-21 08:50:20 UTC</td>
<td>12</td>
<td>65</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-21 09:10:20 UTC</td>
<td>10</td>
<td>65</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-21 09:30:20 UTC</td>
<td>15</td>
<td>65</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>2015-11-21 09:50:20 UTC</td>
<td>19</td>
<td>66</td>
<td>80</td>
<td>60</td>
</tr>
</tbody>
</table>

<DEVICE-NAME>#
6.1.22 event-history

Displays event history report

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
show event-history
{on <DEVICE-OR-DOMAIN-NAME>}
```

Parameters

- `show event-history {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>event-history</th>
<th>Displays event history report</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Displays event history report on a device or RF Domain</td>
</tr>
<tr>
<td></td>
<td>&lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

Examples

```
nx9500-6C8809#show event-history
EVENT HISTORY REPORT
Generated on '2016-05-13 12:15:27 PDT' by 'admin'

2016-05-13 12:12:54     nx9500-6C8809  DIAG       PWRSPLY_FAIL         Power supply redundancy failure
2016-05-13 12:02:51     nx9500-6C8809  DIAG       PWRSPLY_FAIL         Power supply redundancy failure
2016-05-13 11:55:50     nx9500-6C8809  SYSTEM     LOGIN                Successfully logged
in user 'admin' with privilege 'superuser' from 'ssh'
2016-05-13 11:52:46     nx9500-6C8809  DIAG       PWRSPLY_FAIL         Power supply redundancy failure
2016-05-13 11:42:42     nx9500-6C8809  DIAG       PWRSPLY_FAIL         Power supply redundancy failure
2016-05-13 11:32:38     nx9500-6C8809  DIAG       PWRSPLY_FAIL         Power supply redundancy failure
2016-05-13 11:24:04     nx9500-6C8809  SYSTEM     LOGOUT               Logged out user
'admin' with privilege 'superuser' from '192.168.100.227'
--More--
nx9500-6C8809#
```
6.1.23 event-system-policy

- show commands

  Displays detailed event system policy configuration

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show event-system-policy [config|detail] <EVENT-SYSTEM-POLICY-NAME>

Parameters

- show event-system-policy [config|detail] <EVENT-SYSTEM-POLICY-NAME>

<table>
<thead>
<tr>
<th>event-system-policy</th>
<th>Displays event system policy configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>config</td>
<td>Displays configuration for a specified policy</td>
</tr>
<tr>
<td>detail</td>
<td>Displays detailed configuration for a specified policy</td>
</tr>
<tr>
<td>&lt;EVENT-SYSTEM-POLICY-NAME&gt;</td>
<td>Specify the event system policy name.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config)#show event-system-policy config testpolicy
---------------------------------------------------------------------
MODULE          EVENT            SYSLOG    SNMP   FORWARD        EMAIL
---------------------------------------------------------------------
aaa       radius-discon-msg      on        on      on         default
---------------------------------------------------------------------
rfs7000-37FABE(config)#
6.1.24 ex3500

show commands
Displays EX3500-related statistical data
Supported in the following platforms:
• Wireless Controllers — RFS7000
• Service Platforms — NX7500, NX9500

Syntax
show ex3500 [dir|interfaces|system|upgrade|version|whichboot]
show ex3500 dir {boot-rom|config|on|opcode} {<FILE-NAME>} {on <EX3500-DEVICE-NAME>}
show ex3500 interfaces counters [ether-like stats|ethernet <1-1> <1-52>|ext-if-table stats|if-table stats|portUtil stats|rmon stats] {on <EX3500-DEVICE-NAME>}
show ex3500 [system|upgrade|version|whichboot] {on <EX3500-DEVICE-NAME>}

Parameters
• show ex3500 dir {boot-rom|config|on|opcode} {<FILE-NAME>} {on <EX3500-DEVICE-NAME>}

| ex3500 dir | Displays EX3500 directory information based on the option selected. The options are: boot-rom, config, opcode |
| boot-rom | Optional. Displays only the Boot-ROM information |
| config | Optional. Displays only the configuration file |
| opcode | Optional. Displays only the run-time operation code |
| <FILE-NAME> | Displays the contents of a specified file identified by the <FILE-NAME> keyword. This is the name of configuration file or code image. |
| on | Optional. Executes the command on a specified EX3500 device |
| <EX3500-DEVICE-NAME> | • <DEVICE-NAME> – Specify the device’s name. |

• show ex3500 interfaces counters [ether-like stats|ethernet <1-1> <1-52>|ext-if-table stats|if-table stats|portUtil stats|rmon stats] {on <EX3500-DEVICE-NAME>}

| ex3500 interfaces counters | Displays EX3500 interface counter information based on the option selected. The options are: ether-like, ethernet, ext-if-table, if-table, portUtil, rmon |
| ether-like stats | Displays Managed Information Base (MIB) object statistics for Ethernet-like interfaces |
| ethernet <1-1> <1-52> | Displays the Ethernet port statistics based on the unit identifier and port number selected |
| ext-if-table stats | Displays only the extended interface table statistics |

Notes:
- If none of the specified options is selected, all EX3500 system-related information is displayed.
- This option displays the following for the selected Ethernet interface: extended interface table stats, interface table stats, port utilization information, and remote monitoring stats.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>if-table stats</td>
<td>Displays only the interface table statistics</td>
</tr>
<tr>
<td>portUtil stats</td>
<td>Displays only the port utilization information</td>
</tr>
<tr>
<td>rmon stats</td>
<td>Displays only remote monitoring (RMon) statistics</td>
</tr>
<tr>
<td>on &lt;EX3500-DEVICE-NAME&gt;</td>
<td>Optional. Executes the command on a specified EX3500 device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the device’s name.</td>
</tr>
<tr>
<td>show ex3500</td>
<td>Displays the following information for a specified EX3500 device or all EX3500 devices in the managed network</td>
</tr>
<tr>
<td></td>
<td>system</td>
</tr>
<tr>
<td></td>
<td>Displays EX3500 system information, such as device description, OID string, up time, name, location, contact, MAC address, etc. Some of these information (example, system name) are configurable items, and if not configured are left blank.</td>
</tr>
<tr>
<td></td>
<td>upgrade</td>
</tr>
<tr>
<td></td>
<td>Displays the opcode upgrade configuration settings</td>
</tr>
<tr>
<td></td>
<td>version</td>
</tr>
<tr>
<td></td>
<td>Displays hardware and software version information for a EX3500 system</td>
</tr>
<tr>
<td></td>
<td>whichboot</td>
</tr>
<tr>
<td></td>
<td>Displays boot information</td>
</tr>
<tr>
<td>on &lt;EX3500-DEVICE-NAME&gt;</td>
<td>Optional. Executes the command on a specified EX3500 device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the device’s name.</td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C8809# show ex3500 interfaces counters ethernet 1 17
Ethernet 1/ 17

===== IF table Stats =====
2166458 Octets Input
14734059 Octets Output
14707 Unicast Input
19806 Unicast Output
0 Discard Input
0 Discard Output
0 Error Input
0 Error Output
0 Unknown Protocols Input
0 QLen Output

===== Extended Iftable Stats =====
23 Multi-cast Input
5526 Multi-cast Output
170 Broadcast Input
11 Broadcast Output

===== Ether-like Stats =====
0 Alignment Errors
0 FCS Errors
0 Single Collision Frames
0 Multiple Collision Frames
0 SQE Test Errors
0 Deferred Transmissions
0 Late Collisions
0 Excessive Collisions
0 Internal Mac Transmit Errors
0 Internal Mac Receive Errors
0 Frames Too Long
0 Carrier Sense Errors
0 Symbol Errors
0 Pause Frames Input
0 Pause Frames Output

===== RMON Stats =====
0 Drop Events
16900558 Octets
40243 Packets
170 Broadcast PKTS
23 Multi-cast PKTS
0 Undersize PKTS
0 Oversize PKTS
0 Fragments
0 Jabbers
0 CRC Align Errors
0 Collisions
21065 Packet Size <= 64 Octets
3805 Packet Size 65 to 127 Octets
2448 Packet Size 128 to 255 Octets
797 Packet Size 256 to 511 Octets
2941 Packet Size 512 to 1023 Octets
9187 Packet Size 1024 to 1518 Octets

===== Port Utilization (recent 300 seconds) =====
0 Octets Input in kbits per second
0 Packets Input per second
0.00 % Input Utilization
0 Octets Output in kbits per second
0 Packets Output per second
0.00 % Output Utilization
nx9500-6C8809#
6.1.25 extdev

Displays external device (T5 or EX3500) configuration error history

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000, NX9500, NX9510

Syntax
show extdev error history \{on <T5/EX3500-DEVICE-NAME>\}

Parameters
- show extdev error history \{on <T5/EX3500-DEVICE-NAME>\}

<table>
<thead>
<tr>
<th>extdev error history</th>
<th>Displays external device error history. This command is applicable only to the external devices T5, and EX3500 series switches. Use this command to view configuration error history for all or a specified external device adopted and managed by a WiNG NX9500 series service platform.</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;T5/EX3500-DEVICE-NAME&gt;</td>
<td>Optional. Displays configuration error history on a specified T5 or EX3500 device &lt;T5/EX3500-DEVICE-NAME&gt; – Specify the name of the device.</td>
</tr>
</tbody>
</table>

Examples
nx9500-6C8809#show extdev error history on t5-ED5EAC
%%% No History for this device
nx9500-6C8809#
6.1.26 file

 Displays file system information

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show file [information <FILE>|systems]

Parameters

- show file [information <FILE>|systems]

Examples

nx9500-6C8809#show file systems
File Systems:

<table>
<thead>
<tr>
<th>Size(Mb)</th>
<th>Free(Mb)</th>
<th>Use%</th>
<th>Type</th>
<th>Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>23471</td>
<td>22107</td>
<td>5</td>
<td>flash</td>
<td>nvram:</td>
</tr>
<tr>
<td>117344</td>
<td>111150</td>
<td>5</td>
<td>flash</td>
<td>flash:</td>
</tr>
<tr>
<td>644901</td>
<td>609787</td>
<td>5</td>
<td>flash</td>
<td>internal (/vms)</td>
</tr>
</tbody>
</table>

nx9500-6C8809#show file information
flash:/ nvram:/ startup-config system:/ running-config

nx9500-6C8809#show file information flash:/
flash://
  type is directory

nx9500-6C8809#
6.1.27 file-sync

show commands

Displays file synchronization settings and status on a controller

The file-sync command syncs EAP-TLS X.509 (PKCS#12) certificate between the staging-controller and adoptee AP6522/AP6562 client-bridge access points. The show > file-sync command displays information related to this process.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

Syntax

show file-sync [configuration|history|load-file-status|status] {on <DEVICE-OR-DOMAIN-NAME>}

Parameters

- show file-sync [configuration|history|load-file-status|status] {on <DEVICE-OR-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>file-sync</th>
<th>Displays the following file-synchronization related information: configuration, history, load-file-status, and status</th>
</tr>
</thead>
</table>
| configuration | Displays the following file-synchronization configuration details:
  - automatic file-syncing enabled or disabled. The default setting is disabled.  
  **Note:** The X.509 certificate needs synchronization only if the access point’s radio2, the client-bridge radio, is configured to use EAP-TLS authentication. In which case PKCS#12 certificate needs to be pushed on AP adoption. To enable automatic file syncing, in the controller’s device/profile configuration mode, execute the file-sync > auto command. For more information, see file-sync.  
  - Number of access points the certificate can be simultaneously uploaded. The default is 10.  
  **Note:** To modify the number of simultaneous uploads, in the controller’s device/profile configuration mode, execute the file-sync > count <1-20> command. For more information, see file-sync.  
  - Scheduled certificate upload, if any, details, such time and date of upload.  
  **Note:** To schedule certificate upload, use the file-sync > wireless-certificate command. For more information, see file-sync. |
| history | Displays file synchronization history. Use this option to view statistical data relating to client-bridge certificate synchronization between staging controller and adoptee access points. when executed, a list of all certificate transfers made to the client-bridge is displayed, with the latest transfer listed at the top. |
| load-file-status | Displays the status of PKCS#12 certificate upload to the controller. Use this command to view the status of a in-progress certificate upload,  
 **Note:** For more information on initiating a PKCS#12 certificate upload, see file-sync. |
| status | Displays status of the PKCS#12 certificate synchronization between the controller and the client-bridge access point. |
| on <DEVICE-OR-DOMAIN-NAME> | Optional. Displays file synchronization settings and status on a specified device or RF Domain  
  - <DEVICE-OR-DOMAIN-NAME> — Specify the name of the controller, service platform, or RF Domain. |
Examples

nx9500-6C8809# show file-sync configuration
File Sync Configuration Information
Auto : Disabled
Simultaneous Upload Count : 128
nx9500-6C8809#

nx9500-6C8809# show file-sync load-file-status
Download of wireless_bridge certificate is complete
nx9500-6C8809#

nx9500-6C8809# show file-sync history

<table>
<thead>
<tr>
<th>AP</th>
<th>RESULT</th>
<th>TIME</th>
<th>RETRIES</th>
<th>SYNCED-BY</th>
<th>LAST-SYNC-ERROR</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP6522-491220</td>
<td>failed</td>
<td>2015-05-27</td>
<td>3</td>
<td>B4-C7-99-6C-88-09</td>
<td>Start Upload failed, retries = 3</td>
</tr>
<tr>
<td>AP6522-491220</td>
<td>failed</td>
<td>2015-05-27</td>
<td>3</td>
<td>B4-C7-99-6C-88-09</td>
<td>Start Upload failed, retries = 3</td>
</tr>
<tr>
<td>AP6522-491220</td>
<td>failed</td>
<td>2015-05-27</td>
<td>3</td>
<td>B4-C7-99-6C-88-09</td>
<td>Start Upload failed, retries = 3</td>
</tr>
<tr>
<td>MR733ANACBOMT21</td>
<td>done</td>
<td>2015-05-27</td>
<td>0</td>
<td>B4-C7-99-6C-88-09</td>
<td></td>
</tr>
</tbody>
</table>

nx9500-6C8809#
6.1.28 firewall

Displays wireless firewall information, such as Dynamic Host Configuration Protocol (DHCP) snooping table entries, denial of service statistics, active session summaries, etc.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show firewall [dhcp|dos|flows|neighbors] {on <DEVICE-NAME>}
show firewall [dhcp snoop-table|dos stats] {on <DEVICE-NAME>}
show firewall flows {filter|management|on|stats|wireless-client} {on <DEVICE-NAME>}
show firewall flows {filter} {(dir|dst port <1-65535>|ether|flow-type|icmp|icmpv6|igmp|ip|ipv6|max-idle|min-bytes|min-idle|min-pkts|not|port|src|tcp|udp)} {on <DEVICE-NAME>}
show firewall flows {management {on <DEVICE-NAME>}}{stats {on <DEVICE-NAME>}} {on <DEVICE-NAME>}
show firewall neighbors snoop-table {on <DEVICE-NAME>}

Parameters

- show firewall [dhcp snoop-table|dos stats] {on <DEVICE-NAME>}
- show firewall flows {filter} {(dir|dst|ether|flow-type|icmp|icmpv6|igmp|ip|ipv6|max-idle|min-bytes|min-idle|min-pkts|not|port|src|tcp|udp)} {on <DEVICE-NAME>}

- firewall dhcp
- snoop-table
  Displays DHCP snooping table entries
  - snoop-table – Displays DHCP snooping table entries
  DHCP snooping acts as a firewall between non-trusted hosts and the DHCP server. Snooping table entries contain MAC address, IP address, lease time, binding type, and interface information of non-trusted interfaces.

- dos stats
  Displays Denial of Service (DoS) statistics
  Note: This option is not available in the User Exec mode.

- on <DEVICE-NAME>
  The following keyword is common to the ‘DHCP snooping table’ and ‘DoS stats’ parameters:
  - on <DEVICE-NAME> – Optional. Displays snooping table entries, or DoS stats on a specified device
  - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

- show firewall flows {filter} {(dir|dst|ether|flow-type|icmp|icmpv6|igmp|ip|ipv6|max-idle|min-bytes|min-idle|min-pkts|not|port|src|tcp|udp)} {on <DEVICE-NAME>}

- firewall flows
  Notifies a session has been established

- filter
  Optional. Defines additional firewall flow filter parameters

- dir [wired-wired] [wired-wireless] [wireless-wired] [wireless-wireless]
  Optional. Matches the packet flow direction
  - wired-wired – Wired to wired flows
  - wired-wireless – Wired to wireless flows
  - wireless-wired – Wireless to wired flows
  - wireless-wireless – Wireless to wireless flows
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>dst port &lt;1-65535&gt;</td>
<td>Optional. Matches the destination port with the specified port</td>
<td>• port &lt;1-65535&gt; – Specifies the destination port number from 1 - 65535</td>
</tr>
<tr>
<td>ether</td>
<td>Optional. Displays Ethernet filter options</td>
<td>• dst &lt;MAC&gt; – Matches only the destination MAC address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• host &lt;MAC&gt; – Matches flows containing the specified MAC address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• src &lt;MAC&gt; – Matches only the source MAC address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• vlan &lt;1-4094&gt; – Matches the VLAN number of the traffic with the specified value. Specify a value from 1- 4094.</td>
</tr>
<tr>
<td>flow-type</td>
<td>Optional. Matches the traffic flow type</td>
<td>• bridged – Bridged flows</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• natted – Natted flows</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• routed – Routed flows</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• wireless – Flows belonging to wired hosts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• wireless – Flows containing a mobile unit</td>
</tr>
<tr>
<td>icmp {code</td>
<td>type}</td>
<td>Optional. Matches flows with the specified Internet Control Message Protocol (ICMP) version 4 code and type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• type – Optional. Matches flows with the specified ICMPv4 type</td>
</tr>
<tr>
<td>icmpv6 {code</td>
<td>type}</td>
<td>Optional. Matches flows with the specified ICMP version 6 code and type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• type – Optional. Matches flows with the specified ICMPv6 type</td>
</tr>
<tr>
<td>igmp</td>
<td>Optional. Matches Internet Group Management Protocol (IGMP) flows</td>
<td></td>
</tr>
<tr>
<td>ip [dst &lt;IP&gt;</td>
<td>host &lt;IP&gt;</td>
<td>proto &lt;0-254&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• host &lt;IP&gt; – Matches flows containing IPv4 address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• proto &lt;0-254&gt; – Matches the IPv4 protocol number with the specified number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• src &lt;IP&gt; – Matches source IP address</td>
</tr>
<tr>
<td>ipv6 [dst &lt;IPv6&gt;</td>
<td>host &lt;IPv6&gt;</td>
<td>proto &lt;0-254&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• host &lt;IPv6&gt; – Matches flows containing IPv6 address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• proto &lt;0-254&gt; – Matches the IPv6 protocol number with the specified number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• src &lt;IPv6&gt; – Matches source IPv6 address</td>
</tr>
<tr>
<td>max-idle &lt;1-4294967295&gt;</td>
<td>Optional. Filters firewall flows idle for at least the specified duration. Specify a max-idle value from 1 - 4294967295 bytes.</td>
<td></td>
</tr>
<tr>
<td>min-bytes &lt;1-4294967295&gt;</td>
<td>Optional. Filters firewall flows with at least the specified number of bytes. Specify a min-bytes value from 1 - 4294967295 bytes.</td>
<td></td>
</tr>
<tr>
<td>min-idle &lt;1-4294967295&gt;</td>
<td>Optional. Filters firewall flows idle for at least the specified duration. Specify a min-idle value from 1 - 4294967295 bytes.</td>
<td></td>
</tr>
<tr>
<td>min-pkts &lt;1-4294967295&gt;</td>
<td>Optional. Filters firewall flows with at least the given number of packets. Specify a min-bytes value from 1 - 4294967295 bytes.</td>
<td></td>
</tr>
<tr>
<td>not</td>
<td>Optional. Negates the filter expression selected</td>
<td></td>
</tr>
<tr>
<td>port &lt;1-65535&gt;</td>
<td>Optional. Matches either the source or destination port. Specify a port from 1 - 65535.</td>
<td></td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>src &lt;1-65535&gt;</td>
<td>Optional. Matches only the source port with the specified port. Specify a port from 1 - 65535.</td>
<td></td>
</tr>
<tr>
<td>tcp</td>
<td>Optional. Matches TCP flows</td>
<td></td>
</tr>
<tr>
<td>udp</td>
<td>Optional. Matches UDP flows</td>
<td></td>
</tr>
</tbody>
</table>

- show firewall flows {management {on <DEVICE-NAME>}} | Displays management traffic firewall flows. Can use {stats {on <DEVICE-NAME>}} for active session summary and wireless-client <MAC> to display wireless client firewall flows.
- management {on <DEVICE-NAME>} | Optional. Displays management traffic firewall flows.
- stats {on <DEVICE-NAME>} | Optional. Displays active session summary.
- [on <DEVICE-NAME>] | Optional. Displays firewall flows on a specified device.
- <DEVICE-NAME> | Specify the name of the AP, wireless controller, or service platform.

- show firewall neighbors snoop-table {on <DEVICE-NAME>} | Displays IPv6 neighbors snoop table entries.
- firewall neighbors snoop-table | Displays IPv6 neighbors snoop table entries.
- on <DEVICE-NAME> | Optional. Displays IPv6 neighbors snoop table entries on a specified device.
- <DEVICE-NAME> | Specify the name of the AP, wireless controller, or service platform.

**Examples**

```
rfs7000-6DCD4B(config)#show firewall dhcp snoop-table
Snoop Binding <10.2.0.1, 00-00-00-00-00-00, Vlan 1>
   Type router, Touched 686539 seconds ago
Snoop Binding <172.18.0.2, B4-C7-99-6D-CD-4B, Vlan 1>
   Type switch-SVI, Touched 688432 seconds ago
Snoop Binding <192.168.13.111, B4-C7-99-6D-CD-4B, Vlan 192>
   Type switch-SVI, Touched 688431 seconds ago
```

```
rfs7000-6DCD4B(config)#
```
rfs7000-6DCD4B(config)#show firewall dos stats

<table>
<thead>
<tr>
<th>ATTACK TYPE</th>
<th>COUNT</th>
<th>LAST OCCURENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>udp-short-hdr</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>multicast-icmpv6</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>icmp-router-solicit</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>tcp-xmas-scan</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>ascend</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>twinge</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>tcp-post-syn</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>land</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>broadcast-multicast-icmp</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>ftp-bounce</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>spoof</td>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>source-route</td>
<td>0</td>
<td>Never</td>
</tr>
</tbody>
</table>

--More--

rfs7000-6DCD4B(config)#

rfs7000-6DCD4B(config)#show firewall flows management

====== Flow# 1 Summary ======
Forward:
IPv4 Vlan 192, TCP 192.168.13.10 port 2909 > 192.168.13.111 port 22
00-02-B3-28-D1-55 > B4-C7-99-6D-CD-4B, ingress port ge2
Egress port: <local>, Egress interface: vlan192, Next hop: <local> (B4-C7-99-6D-CD-4B)
1451 packets, 116262 bytes, last packet 0 seconds ago
Reverse:
IPv4 Vlan 192, TCP 192.168.13.111 port 22 > 192.168.13.10 port 2909
B4-C7-99-6D-CD-4B > 00-02-B3-28-D1-55, ingress port local
Egress port: ge2, Egress interface: vlan192, Next hop: 192.168.13.10 (00-02-B3-28-D1-55)
1284 packets, 148585 bytes, last packet 1 seconds ago
TCP state: Established
Flow times out in 1 hour 30 minutes

rfs7000-6DCD4B(config)#

rfs7000-6DCD4B(config)#show firewall flows stats

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Flows</td>
<td>3</td>
</tr>
<tr>
<td>TCP/IPv4 flows</td>
<td>0</td>
</tr>
<tr>
<td>UDP/IPv4 flows</td>
<td>2</td>
</tr>
<tr>
<td>DHCP/IPv4 flows</td>
<td>0</td>
</tr>
<tr>
<td>ICMP/IPv4 flows</td>
<td>0</td>
</tr>
<tr>
<td>IPsec/IPv4 flows</td>
<td>0</td>
</tr>
<tr>
<td>TCP/IPv6 flows</td>
<td>1</td>
</tr>
<tr>
<td>UDP/IPv6 flows</td>
<td>0</td>
</tr>
<tr>
<td>DHCP/IPv6 flows</td>
<td>0</td>
</tr>
<tr>
<td>ICMP/IPv6 flows</td>
<td>0</td>
</tr>
<tr>
<td>IPsec/IPv6 flows</td>
<td>0</td>
</tr>
<tr>
<td>L3/Unknown flows</td>
<td>0</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B(config)#
6.1.29 global

* show commands

Displays global information for network devices based on the parameters passed.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show global [device-list|domain]

show global device-list {filter {offline|online|rf-domain}}
show global device-list {filter {offline|online}}
show global device-list {filter rf-domain [<DOMAIN-NAME>|not <DOMAIN-NAME>]}  
show global domain managers
```

**Parameters**

- show global device-list {filter {offline|online}}

<table>
<thead>
<tr>
<th>global device-list</th>
<th>Displays global information for all network devices. Use the following keywords to specify additional filters: offline, online, and rf-domain.</th>
</tr>
</thead>
</table>
| filter offline| Optional. Specifies additional filters
- offline – Optional. Displays global information for offline devices only
- online – Optional. Displays global information for online devices only

| filter online| Optional. Specifies additional filters
- offline – Optional. Displays global information for offline devices only
- online – Optional. Displays global information for online devices only

<table>
<thead>
<tr>
<th>global device-list</th>
<th>Displays global information for all network devices. Use the following keywords to specify additional filters: offline, online, and rf-domain.</th>
</tr>
</thead>
</table>
| filter rf-domain [<DOMAIN-NAME>|not <DOMAIN-NAME>] | Optional. Specifies additional filters
- rf-domain – Optional. Displays global information for all devices in a specified RF Domain
- <DOMAIN-NAME> – Optional. Displays information of all devices within the domain identified by the <DOMAIN-NAME> keyword
- not <DOMAIN-NAME> – Optional. Displays information of all devices in domains not matching the <DOMAIN-NAME> keyword

- show global domain managers

<table>
<thead>
<tr>
<th>global domain managers</th>
<th>Displays global information for all RF Domains and managers in the network</th>
</tr>
</thead>
</table>
Examples

rfs7000-6DCD4B(config)#show global device-list filter rf-domain default

<table>
<thead>
<tr>
<th>MAC</th>
<th>HOST-NAME</th>
<th>TYPE</th>
<th>CLUSTER</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
<th>ONLINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-15-70-81-74-2D</td>
<td>rfs6000-81742D</td>
<td>rfs6000</td>
<td>default</td>
<td>default</td>
<td>B4-C7-99-6D-CD-4B</td>
<td>online</td>
</tr>
<tr>
<td>00-23-68-11-E6-C4</td>
<td>ap7131-11E6C4</td>
<td>ap71xx</td>
<td>default</td>
<td>default</td>
<td></td>
<td>offline</td>
</tr>
<tr>
<td>B4-C7-99-6D-CD-4B</td>
<td>rfs7000-6DCD4B</td>
<td>rfs7000</td>
<td>default</td>
<td>default</td>
<td></td>
<td>online</td>
</tr>
<tr>
<td>B4-C7-99-71-17-28</td>
<td>ap8132-711728</td>
<td>ap81xx</td>
<td>default</td>
<td>00-15-70-81-74-2D</td>
<td></td>
<td>online</td>
</tr>
<tr>
<td>B4-C7-99-74-B4-5C</td>
<td>ap81xx-74B45C</td>
<td>ap81xx</td>
<td>default</td>
<td>00-15-70-81-74-2D</td>
<td></td>
<td>online</td>
</tr>
</tbody>
</table>

Total number of clients displayed: 5
rfs7000-6DCD4B(config)#

rfs7000-6DCD4B(config)#show global domain managers

<table>
<thead>
<tr>
<th>RF-DOMAIN</th>
<th>MANAGER</th>
<th>HOST-NAME</th>
<th>APS</th>
<th>CLIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>B4-C7-99-6D-CD-4B</td>
<td>rfs7000-6DCD4B</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Total number of RF-domain displayed: 1
rfs7000-6DCD4B(config)#
6.1.30  gre

-show commands

Displays layer 2 Generic Routing Encapsulation (GRE) tunnel traffic flow information

GRE is one of the available tunneling mechanisms which uses IP as the transport protocol and can be used for carrying many different passenger protocols. The tunnels behave as virtual point-to-point links that have two endpoints identified by the tunnel source and tunnel destination addresses at each endpoint.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show gre info {detail} {(on <DEVICE-NAME>)}

Parameters

- show gre info {detail} {(on <DEVICE-NAME>)}

---

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>gre info</td>
<td>Displays GRE tunnel information</td>
</tr>
<tr>
<td>detail</td>
<td>Optional. Displays GRE tunnel information in detail, such as tunnel state, tunnel's remote-end peer device’s IP address, session ID of an operational tunnel, total number of packets received and transmitted through the tunnel, and the number of dropped packets during tunneled exchanges between access point and a peer at the remote end of the tunnel.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Executes the command on a specified device</td>
</tr>
</tbody>
</table>

Examples

nx4500-5CFA2B>show gre info
Gre Tunnel info:

{'No tunnel found': 0}

nx4500-5CFA2B>
## 6.1.31 guest-registration

### show commands

Displays information on the performance of clients using guest access permissions to obtain network resources within the WiNG network. The reporting timeline can be adjusted as needed, as can the RF Domain(s) and WLAN(s) used to filter and report guest client statistics.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

### Syntax

```
show guest-registration [age-range|backup-snapshots|browsers|client|devices|gender|
                      loyalty-app-status|notification-status|os|social|user-trends|visitors]
                     {on <DEVICE-NAME>}

show guest-registration backup-snapshots

show guest-registration [age-range|browsers|devices|gender|os|user-trends|visitors]
                     time [1-Day|1-Month|1-Week|2-Hours|30-Mins|5-Hours|all] 
                     { (rfdomain <DOMAIN-NAME>|wlan <WLAN-NAME> ) }  

show guest-registration client [email|mac|member|mobile|name|time]

show guest-registration client [email <EMAIL-ADDRESS>|mac <MAC>|member <MEMBER-ID>|
                         mobile <MOBILE-NUMBER>|name <NAME>]

show guest-registration client time [1-Hour|10-Mins|15-Mins|2-Mins|30-Mins|30-Secs|
                         5-Mins] { (rfdomain <DOMAIN-NAME>|wlan <WLAN-NAME> ) }  

show guest-registration loyalty-app-status time [1-Day|1-Month|1-Week|2-Hours|
                         30-Mins|5-Hours|all] { rfdomain <RF-DOMAIN-NAME>|wlan <WLAN-NAME> }  

show guest-registration notification-status

show guest-registration social time [1-Day|1-Month|1-Week|2-Hours|30-Mins|5-Hours|all] 
                         { (facebook|rfdomain <DOMAIN-NAME>|wlan <WLAN-NAME>|google) }
```

### Parameters

- `guest-registration` Displays guest registration statistics based on the parameters passed
- `backup-snapshots` Displays a list of periodically backed up snapshots of the database. By default, the system maintains a snapshot of the database on a daily basis.
  
  **Note:** Use the `service > guest-registration > backup [delete|restore]` command to delete these snapshots and to restore deleted snapshots. For more information, see `service`.

- `age-range` Displays the age ranges of logged guest users for a selected time period
- `browsers` Displays the browsers used by guest users logged in within a selected time period
- `devices` Displays the device types used by guest users logged in within a selected time period
- `gender` Displays the gender of guest users logged in within a selected time period

---

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show guest-registration</td>
<td>Displays guest registration statistics based on the parameters passed</td>
</tr>
</tbody>
</table>
| backup-snapshots | Displays a list of periodically backed up snapshots of the database. By default, the system maintains a snapshot of the database on a daily basis. **Note:** Use the `service > guest-registration > backup [delete|restore]` command to delete these snapshots and to restore deleted snapshots. For more information, see `service`.

- `age-range` | Displays the age ranges of logged guest users for a selected time period |
- `browsers` | Displays the browsers used by guest users logged in within a selected time period |
- `devices` | Displays the device types used by guest users logged in within a selected time period |
- `gender` | Displays the gender of guest users logged in within a selected time period |
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>os</td>
<td>Displays the operating system (OS) of devices logged in within a selected time period.</td>
</tr>
<tr>
<td>user-trends</td>
<td>Displays guest user login trends for a selected time period. It displays statistical data, such as number of new users, number of return users, and total of number users.</td>
</tr>
<tr>
<td>visitors</td>
<td>Displays type of visitors logged in within a selected time period.</td>
</tr>
</tbody>
</table>
| time [1-Day|1-Month|1-Week|2-Hours|30-Mins|5-Hours|all] | Displays guest registration statistics, for a specified time period. The stats displayed depends on the option selected in the previous step. Specify the time period using one of the following options:  
- 1-Day – Displays previous day’s statistics  
- 1-Month – Displays previous month’s statistics  
- 1-Week – Displays previous week’s statistics  
- 2-Hours – Displays last 2 hours statistics  
- 30-Mins – Displays last 30 minutes statistics  
- 5-Hours – Displays last 5 hours statistics  
- all – Displays statistics from the day the database was created |
| [rfdomain <DOMAIN-NAME> wlan <WLAN-NAME>] | Use the following options as additional filters:  
- <DOMAIN-NAME> – Specify the RF Domain name.  
- wlan <WLAN-NAME> – Optional. Displays guest registration statistics for a specified WLAN.  
- <WLAN-NAME> – Specify the WLAN name. |
| guest-registration | Displays guest registration statistics based on the parameters and time entered. Optionally, use the ‘rfdomain’ and/or ‘wlan’ keywords to view guest registration statistics for a specified RF Domain and/or WLAN. |
| client | Displays statistical data for a specific client. Use the e-mail, mac, member, mobile, name to provide a match criteria. |
| email <EMAIL-ADDRESS> | Displays statistical data for the client with e-mail address matching the <EMAIL-ADDRESS> parameter.  
- <EMAIL-ADDRESS> – Specify the client’s e-mail address. |
| mac <MAC> | Displays statistical data for the client with MAC address matching the <MAC> parameter.  
- <MAC> – Specify the client’s MAC address. |
| member <MEMBER-ID> | Displays statistical data for the client with member ID matching the <MEMBER-ID> parameter.  
- <MEMBER-ID> – Specify the client’s member ID. |
| mobile <MOBILE-NUMBER> | Displays statistical data for the client with mobile number matching the <MOBILE-NUMBER> parameter.  
- <MOBILE-NUMBER> – Specify the client’s mobile number. |
| name <NAME> | Displays statistical data for the client with name matching the <NAME> parameter.  
- <NAME> – Specify the client’s name. |
show guest-registration client time [1-Hour|10-Mins|15-Mins|2-Mins|30-Mins|30-Secs|5-Mins] {rfdomain <DOMAIN-NAME>|wlan <WLAN-NAME>}

guest-registration

Displays guest registration statistics based on the parameters and time entered. Optionally, use the 'rfdomain' and/or 'wlan' keywords to view guest registration statistics for a specified RF Domain and/or WLAN.

client

Displays statistical data for all clients logged in within a specified time period.

time [1-Day|1-Month|1-Week|2-Hours|30-Mins|5-Hours|all]

Use one of the following options to specify the time period:
- 1-Day – Displays previous day’s statistics
- 1-Month – Displays previous month's statistics
- 1-Week – Displays previous week’s statistics
- 2-Hours – Displays last 2 hours statistics
- 30-Mins – Displays last 30 minutes statistics
- 5-Hours – Displays last 5 hours statistics
- all – Displays entire statistics, from the day the database was created

[rfdomain <DOMAIN-NAME> wlan <WLAN-NAME>]

Use the following options as additional filters:
- <DOMAIN-NAME> – Specify the RF Domain name.
- wlan <WLAN-NAME> – Optional. Displays guest registration statistics for a specified WLAN.
- <WLAN-NAME> – Specify the WLAN name.

show guest-registration loyalty-app-status time [1-Day|1-Month|1-Week|2-Hours|30-Mins|5-Hours|all] {rfdomain <RF-DOMAIN-NAME>|wlan <WLAN-NAME>}

guest-registration

Displays guest registration statistics based on the parameters and time entered.

loyalty-app-status

Displays captive portal clients' Loyalty Application analytics, such as the number of guest clients with loyalty application detection enabled, associating with the captive portal's access point during a specified time period.

Loyalty application detection occurs on the access point to which the guest client is associated, allowing a retail administrator to assess whether a captive portal client is using specific retail (loyalty) applications in their captive portal.

Note: For more information on enabling loyalty application detection on a captive portal, see report-loyalty-application.

time [1-Day|1-Month|1-Week|2-Hours|30-Mins|5-Hours|all]

Specifies the time period, using one of the following options:
- 1-Day – Displays previous day’s captive portal clients’ Loyalty Application analytics
- 1-Month – Displays previous month's captive portal clients’ Loyalty Application analytics
- 1-Week – Displays previous week’s captive portal clients’ Loyalty Application analytics
- 2-Hours – Displays last 2 hours captive portal clients’ Loyalty Application analytics
- 30-Mins – Displays last 30 minutes captive portal clients’ Loyalty Application analytics
- 5-Hours – Displays last 5 hours captive portal clients’ Loyalty Application analytics
- all – Displays the entire Loyalty Application analytics, from the day the database was created.
### show guest-registration notification-status

- **guest-registration**
  - Displays guest registration statistics based on the parameters and time entered. Optionally, use the ‘rfdomain’ and/or ‘wlan’ keywords to view guest registration statistics for a specified RF Domain and/or WLAN.

- **notification-status**
  - Displays guest registration notification status.

### show guest-registration social time [1-Day|1-Month|1-Week|2-Hours|30-Mins|5-Hours|all] {facebook|rfdomain <DOMAIN-NAME>|wlan <WLAN-NAME>|google}

- **guest-registration social**
  - Displays the social sites used by guests to register. Optionally, use the ‘rfdomain’ and/or ‘wlan’ keywords to view social site used by guests of a specified RF Domain and/or WLAN.

- **time [1-Day|1-Month|1-Week|2-Hours|30-Mins|5-Hours|all]**
  - Displays social site statistics for a specified time period. Use one of the following time options:
    - 1-Day – Displays previous day’s statistics
    - 1-Month – Displays previous month’s statistics
    - 1-Week – Displays previous week’s statistics
    - 2-Hours – Displays last 2 hours statistics
    - 30-Mins – Displays last 30 minutes statistics
    - 5-Hours – Displays last 5 hours statistics
    - all – Displays the entire database

- **facebook**
  - Displays guest users using Facebook to log in

- **rfdomain <DOMAIN-NAME>**
  - Displays guest users for a specific RF Domain
    - <DOMAIN-NAME> – Specify the RF Domain name.

- **wlan <WLAN-NAME>**
  - Displays guest users for a specific WLAN
    - <WLAN-NAME> – Specify the WLAN name.

- **google**
  - Displays guest users using Google to log in

### Examples

```
x9500-6C8809#show guest-registration age-range time all
Timeline: all

<table>
<thead>
<tr>
<th>AGE RANGE</th>
<th>COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>less_than_18</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>18_to_24</td>
<td>1 (20%)</td>
</tr>
<tr>
<td>25_to_34</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>35_to_44</td>
<td>1 (20%)</td>
</tr>
<tr>
<td>45_to_54</td>
<td>1 (20%)</td>
</tr>
<tr>
<td>55_to_64</td>
<td>2 (40%)</td>
</tr>
<tr>
<td>greater_than_64</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>
```

nx9500-6C8809#
nx9500-6C8809#show guest-registration browsers time 1-Day rfdomain Test-rfdomain-10
RF Domain: Test-rfdomain-10 Timeline: 1-Day
-----------------------------------
<table>
<thead>
<tr>
<th>BROWSER</th>
<th>COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safari</td>
<td>1 (50%)</td>
</tr>
<tr>
<td>Chrome</td>
<td>1 (50%)</td>
</tr>
</tbody>
</table>

nx9500-6C8809#

nx9500-6C8809#show guest-registration devices time 30-Mins wlan Test-ssid-9
WLAN: Test-ssid-9 Timeline: 30-Mins
-----------------------------------
<table>
<thead>
<tr>
<th>DEVICE</th>
<th>COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows PC</td>
<td>1 (100%)</td>
</tr>
</tbody>
</table>

nx9500-6C8809#

nx9500-6C8809#show guest-registration gender time all wlan Test-ssid-10 rfdomain Test-rfdomain-10
RF Domain: Test-rfdomain-10 WLAN: Test-ssid-10 Timeline: all
-----------------------------------
<table>
<thead>
<tr>
<th>GENDER</th>
<th>COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1 (50%)</td>
</tr>
<tr>
<td>Female</td>
<td>1 (50%)</td>
</tr>
<tr>
<td>Other</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

nx9500-6C8809#

nx9500-6C8809#show guest-registration os time 1-Day
Timeline: 1-Day
-----------------------------------
<table>
<thead>
<tr>
<th>OS</th>
<th>COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 7</td>
<td>3 (30%)</td>
</tr>
<tr>
<td>Apple iOS</td>
<td>3 (30%)</td>
</tr>
<tr>
<td>Macintosh</td>
<td>3 (30%)</td>
</tr>
<tr>
<td>Windows 8</td>
<td>1 (10%)</td>
</tr>
</tbody>
</table>

nx9500-6C8809#

nx9500-6C8809#show guest-registration social time 30-Mins
Timeline: 30-Mins
-----------------------------------
<table>
<thead>
<tr>
<th>SOCIAL</th>
<th>ONLINE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>google</td>
<td>1 (100%)</td>
<td>1 (10%)</td>
</tr>
<tr>
<td>Local</td>
<td>0 (0%)</td>
<td>9 (90%)</td>
</tr>
</tbody>
</table>

nx9500-6C8809#
nx9500-6C8809#show guest-registration user-trends time all
Timeline: all

<table>
<thead>
<tr>
<th>SAMPLE RANGE</th>
<th>NEW USERS</th>
<th>RETURN USERS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014-2-16 - 2014-4-17</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
<tr>
<td>2014-4-17 - 2014-6-16</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
<tr>
<td>2014-6-16 - 2014-8-15</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
<tr>
<td>2014-8-15 - 2014-10-14</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
<tr>
<td>2014-10-14 - 2014-12-13</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
<tr>
<td>2014-12-13 - 2015-2-11</td>
<td>10 (100%)</td>
<td>0 ( 0%)</td>
<td>10</td>
</tr>
</tbody>
</table>

nx9500-6C8809#

nx9500-6C8809#show guest-registration user-trends time 1-Day
Timeline: 1-Day

<table>
<thead>
<tr>
<th>SAMPLE RANGE</th>
<th>NEW USERS</th>
<th>RETURN USERS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>23:16 - 3:16</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
<tr>
<td>3:16 - 7:16</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
<tr>
<td>7:16 - 11:16</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
<tr>
<td>11:16 - 15:16</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
<tr>
<td>15:16 - 19:16</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
<tr>
<td>19:16 - 23:16</td>
<td>0 ( 0%)</td>
<td>0 ( 0%)</td>
<td>0</td>
</tr>
</tbody>
</table>

nx9500-6C8809#

nx9500-6C8809#show guest-registration visitors time 30-Mins
Timeline: 30-Mins

<table>
<thead>
<tr>
<th>VISITORS</th>
<th>COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Users</td>
<td>7 (70%)</td>
</tr>
<tr>
<td>Return Users</td>
<td>3 (30%)</td>
</tr>
</tbody>
</table>

nx9500-6C8809#

nx9500-6C8809#show guest-registration client time 30-Mins email Guest_9@abc.com

<table>
<thead>
<tr>
<th>ATTRIBUTE</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>city</td>
<td>Brooklyn</td>
</tr>
<tr>
<td>wlan</td>
<td>Test-ssid-10</td>
</tr>
<tr>
<td>name</td>
<td>Guest_9</td>
</tr>
<tr>
<td>zip</td>
<td>11204</td>
</tr>
<tr>
<td>mobile</td>
<td>9131373709</td>
</tr>
<tr>
<td>gender</td>
<td>female</td>
</tr>
<tr>
<td>lloginTime</td>
<td>2015-01-20 19:11:14.001000</td>
</tr>
<tr>
<td>mobileok</td>
<td>on</td>
</tr>
<tr>
<td>devtype</td>
<td>Windows PC</td>
</tr>
<tr>
<td>createtime</td>
<td>2015-01-20 18:27:14.001000</td>
</tr>
<tr>
<td>email</td>
<td><a href="mailto:Guest_9@abc.com">Guest_9@abc.com</a></td>
</tr>
<tr>
<td>mac</td>
<td>10-00-00-10-00-09</td>
</tr>
<tr>
<td>reg_type</td>
<td>otp</td>
</tr>
<tr>
<td>rfd</td>
<td>Test-rfdomain-10</td>
</tr>
<tr>
<td>agerange</td>
<td>&lt;18</td>
</tr>
<tr>
<td>group</td>
<td>mac_reg_gr1</td>
</tr>
<tr>
<td>mid</td>
<td>1234100009</td>
</tr>
<tr>
<td>os</td>
<td>Windows 7</td>
</tr>
<tr>
<td>browser</td>
<td>Safari</td>
</tr>
</tbody>
</table>

nx9500-6C8809#
nx9500-6C8809#show guest-registration client time 30-Mins rfdomain Test-rfdomain-8

<table>
<thead>
<tr>
<th>ATTRIBUTE</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>loggedin</td>
<td>yes</td>
</tr>
<tr>
<td>wlan</td>
<td>Test-ssid-8</td>
</tr>
<tr>
<td>name</td>
<td>Guest_1</td>
</tr>
<tr>
<td>locale</td>
<td>en_US</td>
</tr>
<tr>
<td>llogintime</td>
<td>2015-01-20 19:15:14</td>
</tr>
<tr>
<td>devtype</td>
<td>Macintosh</td>
</tr>
<tr>
<td>exptime</td>
<td>2015-11-16 19:21:14</td>
</tr>
<tr>
<td>lname</td>
<td>Guest_100000</td>
</tr>
<tr>
<td>source</td>
<td>google</td>
</tr>
<tr>
<td>mac</td>
<td>10-00-00-10-00-01</td>
</tr>
<tr>
<td>email</td>
<td><a href="mailto:Guest_1@abc.com">Guest_1@abc.com</a></td>
</tr>
<tr>
<td>id</td>
<td>657669862939196</td>
</tr>
<tr>
<td>reg_type</td>
<td>device</td>
</tr>
<tr>
<td>fname</td>
<td>Test-Guest_1</td>
</tr>
<tr>
<td>rfd</td>
<td>Test-rfdomain-8</td>
</tr>
<tr>
<td>agerange</td>
<td>35-44</td>
</tr>
<tr>
<td>timezone</td>
<td>7</td>
</tr>
<tr>
<td>profilePic</td>
<td><a href="https://www.google.com/user_id/657669862939196/">https://www.google.com/user_id/657669862939196/</a></td>
</tr>
<tr>
<td>os</td>
<td>Macintosh</td>
</tr>
<tr>
<td>createtime</td>
<td>2015-01-20 18:45:14</td>
</tr>
<tr>
<td>group</td>
<td>mac_reg_gr1</td>
</tr>
<tr>
<td>browser</td>
<td>Chrome</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ATTRIBUTE</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>city</td>
<td>Santa Cruz</td>
</tr>
<tr>
<td>group</td>
<td>mac_reg_gr1</td>
</tr>
<tr>
<td>name</td>
<td>Guest_2</td>
</tr>
<tr>
<td>zip</td>
<td>95062</td>
</tr>
<tr>
<td>mobile</td>
<td>3700870747</td>
</tr>
<tr>
<td>mid</td>
<td>1234100001</td>
</tr>
<tr>
<td>llogintime</td>
<td>2015-01-20 19:18:14</td>
</tr>
<tr>
<td>mobileok</td>
<td>on</td>
</tr>
<tr>
<td>devtype</td>
<td>Apple iPad</td>
</tr>
<tr>
<td>exptime</td>
<td>2015-11-16 19:21:14</td>
</tr>
<tr>
<td>createtime</td>
<td>2015-01-20 19:11:14</td>
</tr>
<tr>
<td>mac</td>
<td>10-00-00-10-00-02</td>
</tr>
<tr>
<td>reg_type</td>
<td>otp</td>
</tr>
<tr>
<td>rfd</td>
<td>Test-rfdomain-8</td>
</tr>
<tr>
<td>agerange</td>
<td>55-64</td>
</tr>
<tr>
<td>wlan</td>
<td>Test-ssid-8</td>
</tr>
<tr>
<td>os</td>
<td>Apple iOS</td>
</tr>
<tr>
<td>email</td>
<td><a href="mailto:Guest_2@abc.com">Guest_2@abc.com</a></td>
</tr>
<tr>
<td>browser</td>
<td>Chrome</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ATTRIBUTE</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>city</td>
<td>Los Angeles</td>
</tr>
<tr>
<td>group</td>
<td>mac_reg_gr1</td>
</tr>
<tr>
<td>name</td>
<td>Guest_5</td>
</tr>
<tr>
<td>zip</td>
<td>90001</td>
</tr>
<tr>
<td>mobile</td>
<td>9129618672</td>
</tr>
<tr>
<td>mid</td>
<td>1234100005</td>
</tr>
<tr>
<td>llogintime</td>
<td>2015-01-20 19:20:14</td>
</tr>
<tr>
<td>devtype</td>
<td>Macintosh</td>
</tr>
<tr>
<td>exptime</td>
<td>2015-11-16 19:21:14</td>
</tr>
<tr>
<td>createtime</td>
<td>2015-01-20 19:05:14</td>
</tr>
<tr>
<td>mac</td>
<td>10-00-00-10-00-05</td>
</tr>
<tr>
<td>reg_type</td>
<td>device</td>
</tr>
<tr>
<td>rfd</td>
<td>Test-rfdomain-8</td>
</tr>
<tr>
<td>agerange</td>
<td>18-24</td>
</tr>
<tr>
<td>wlan</td>
<td>Test-ssid-8</td>
</tr>
<tr>
<td>os</td>
<td>Macintosh</td>
</tr>
<tr>
<td>email</td>
<td><a href="mailto:Guest_5@abc.com">Guest_5@abc.com</a></td>
</tr>
<tr>
<td>browser</td>
<td>Chrome</td>
</tr>
</tbody>
</table>

nx9500-6C8809#
nx7500-112233# show guest-registration loyalty-app-status time all

Timeline: all

<table>
<thead>
<tr>
<th>LOYALTY APP STATUS</th>
<th>COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loyalty App Users</td>
<td>491 (49%)</td>
</tr>
<tr>
<td>Others</td>
<td>510 (51%)</td>
</tr>
</tbody>
</table>

nx7500-112233#
### 6.1.32 interface

- **show commands**
  Displays configured system interfaces and their status

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
show interface {<INTERFACE-NAME>|brief|counters|ge <1-4>|me1|port-channel <1-2>|pppoe1|switchport|vlan <1-4094>|wwan1} {on <DEVICE-NAME>}
show interface {<INTERFACE-NAME>|brief|counters|ge <1-4>|me1|port-channel <1-2>|pppoe1|switchport|vlan <1-4094>|wwan1} {on <DEVICE-NAME>}
```

**Parameters**

- **interface**
  Optional. Displays system interface status based on the parameters passed
- **<INTERFACE-NAME>**
  Optional. Displays status of the interface specified by the `<INTERFACE-NAME>` parameter. Specify the interface name.
- **brief**
  Optional. Displays a brief summary of the interface status and configuration
- **counters**
  Optional. Displays interface Tx or Rx counters
- **ge <1-4>**
  Optional. Displays Gigabit Ethernet interface status and configuration
  - `<1-4>` – Select the Gigabit Ethernet interface index from 1 - 4.
  **Note:** For the NX45XX and NX65XX service platforms the index range is <1 - 24>.
- **me1**
  Optional. Displays Fast Ethernet interface status and configuration
- **port-channel <1-2>**
  Optional. Displays port channel interface status and configuration
  - `<1-2>` – Specify the port channel index from 1 - 2.
- **pppoe1**
  Optional. Displays PPP over Ethernet interface status and configuration
- **switchport**
  Optional. Displays layer 2 interface status
- **vlan <1-4094>**
  Optional. Displays VLAN interface status and configuration
  - `<1-4094>` – Specify the `Switch Virtual Interface (SVI)` VLAN ID from 1 - 4094.
- **wwan1**
  Optional. Displays Wireless WAN interface status, configuration, and counters
- **on <DEVICE-NAME>**
  The following keywords are common to all of the above interfaces:
  - **on <DEVICE-NAME>** – Optional. Displays interface related information on a specified device
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.
Examples

Following interfaces are available on a RFS7000 controller:

```bash
rfs7000-6DCD4B(config)#show interface ?
WORD  Interface name
brief  Brief summary of interface status and configuration
counters Interface tx/rx counters
ge    GigabitEthernet interface
me1   FastEthernet interface
on    On AP/Controller
port-channel Port-Channel interface
pppoel PPP Over Ethernet interface
switchport Status of Layer2 interfaces
vlan  Switch VLAN interface
wwan1 Wireless WAN interface
|    Output modifiers
>    Output redirection
>>   Output redirection appending
<cr>
rfs7000-6DCD4B(config)#
```

Following interfaces are available on a NX45XX and NX65XX series service platform:

```bash
nx4500-5CFA2B(config)#show interface ?
WORD  Interface name
brief  Brief summary of interface status and configuration
counters Interface tx/rx counters
ge    GigabitEthernet interface
on    On AP/Controller
pppoel PPP Over Ethernet interface
serial Serial interface
switchport Status of Layer2 interfaces
tle1  T1/E1 interface
up    WAN Ethernet interface
vlan  Switch VLAN interface
vmif  Virtual Machine interface
wwan1 Wireless WAN interface
|    Output modifiers
>    Output redirection
>>   Output redirection appending
<cr>
nx4500-5CFA2B(config)#
```

```bash
rfs7000-6DCD4B(config)#show interface switchport
------------------------------------------------------------------------
INTERFACE          STATUS   MODE     VLAN(S)
------------------------------------------------------------------------
ge1                UP       access   1
ge2                UP       access   192
ge3                DOWN     access   1
ge4                DOWN     access   1
------------------------------------------------------------------------
A '*' next to the VLAN ID indicates the native vlan for that trunk port
rfs7000-6DCD4B(config)#
```

```bash
rfs7000-6DCD4B(config)#show interface ge 2
Interface ge2 is UP
Hardware-type: ethernet, Mode: Layer 2, Address: B4-C7-99-6D-CD-4D
Index: 2002, Metric: 1, MTU: 1500
Speed: Admin Auto, Operational 100M, Maximum 1G
Duplex: Admin Auto, Operational Full
Active-medium: Copper
Switchport settings: access, access-vlan: 192
Input packets 356055, bytes 118606892, dropped 0
Received 55855 unicasts, 38581 broadcasts, 261619 multicasts
Input errors 0, runts 0, giants 0
CRC 0, frame 0, fragment 0, jabber 0
```
Output packets 24790, bytes 2250297, dropped 0
Sent 21651 unicas, 4 broadcasts, 3135 multicasts
Output errors 0, collisions 0, late collisions 0
Excessive collisions 0

rfs7000-6DCD4B(config)#

rfs7000-6DCD4B(config)#show interface counters

<table>
<thead>
<tr>
<th>INF</th>
<th>MAC</th>
<th>RX-PKTS</th>
<th>RX-BYTES</th>
<th>RX-DROP</th>
<th>TX-PKTS</th>
<th>TX-BYTES</th>
<th>TX-DROP</th>
</tr>
</thead>
<tbody>
<tr>
<td>me1</td>
<td>B4-C7-99-6D-CD-50</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>vlan1</td>
<td>B4-C7-99-6D-CD-4B</td>
<td>302809</td>
<td>31378711</td>
<td>0</td>
<td>287885</td>
<td>31198711</td>
<td>0</td>
</tr>
<tr>
<td>vlan192</td>
<td>B4-C7-99-6D-CD-4B</td>
<td>348726</td>
<td>109702923</td>
<td>0</td>
<td>72561</td>
<td>77318385</td>
<td>0</td>
</tr>
<tr>
<td>ge1</td>
<td>B4-C7-99-6D-CD-4C</td>
<td>135448</td>
<td>18211575</td>
<td>0</td>
<td>196016</td>
<td>23063136</td>
<td>0</td>
</tr>
<tr>
<td>ge2</td>
<td>B4-C7-99-6D-CD-4D</td>
<td>353593</td>
<td>118284345</td>
<td>0</td>
<td>24517</td>
<td>2213093</td>
<td>0</td>
</tr>
<tr>
<td>ge3</td>
<td>B4-C7-99-6D-CD-4E</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>37316</td>
<td>3552250</td>
<td>0</td>
</tr>
<tr>
<td>ge4</td>
<td>B4-C7-99-6D-CD-4F</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>37316</td>
<td>3552250</td>
<td>0</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B(config)#

rfs7000-6DCD4B(config)#show interface vlan 1

Interface vlan1 is UP
Hardware-type: vlan, Mode: Layer 3, Address: B4-C7-99-6D-CD-4B
Index: 5, Metric: 1, MTU: 1500
IP-Address: 172.18.0.2/24
input packets 309098, bytes 32029267, dropped 0, multicast packets 0
input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
output packets 293860, bytes 31845463, dropped 0
output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
collisions 0
IPv6 mode is disabled

rfs7000-6DCD4B(config)#

nx4500-5CFA2B(config)#show interface switchport

<table>
<thead>
<tr>
<th>INTERFACE</th>
<th>STATUS</th>
<th>MODE</th>
<th>VLAN(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up1</td>
<td>UP</td>
<td>access</td>
<td>1</td>
</tr>
<tr>
<td>up2</td>
<td>DOWN</td>
<td>access</td>
<td>1</td>
</tr>
<tr>
<td>vmif1</td>
<td>UP</td>
<td>access</td>
<td>1</td>
</tr>
<tr>
<td>vmif2</td>
<td>UP</td>
<td>access</td>
<td>1</td>
</tr>
<tr>
<td>vmif3</td>
<td>UP</td>
<td>access</td>
<td>1</td>
</tr>
<tr>
<td>vmif4</td>
<td>UP</td>
<td>access</td>
<td>1</td>
</tr>
<tr>
<td>vmif5</td>
<td>UP</td>
<td>access</td>
<td>1</td>
</tr>
<tr>
<td>vmif6</td>
<td>UP</td>
<td>access</td>
<td>1</td>
</tr>
<tr>
<td>vmif7</td>
<td>UP</td>
<td>access</td>
<td>1</td>
</tr>
<tr>
<td>vmif8</td>
<td>UP</td>
<td>access</td>
<td>1</td>
</tr>
</tbody>
</table>

A '*' next to the VLAN ID indicates the native vlan for that trunk port

nx4500-5CFA2B(config)#

nx4500-5CFA2B(config)#show interface vlan 1

Interface vlan1 is UP
Hardware-type: vlan, Mode: Layer 3, Address: B4-C7-99-5C-FA-2B
Index: 27, Metric: 1, MTU: 1500
IP-Address: 192.168.13.12/24
input packets 1664443, bytes 198932875, dropped 0, multicast packets 0
input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
output packets 903614, bytes 110738458, dropped 0
output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
collisions 0
IPv6 mode is disabled

nx4500-5CFA2B(config)#
nx4500-5CFA2B(config)#show interface ge 2
Interface ge2 is DOWN
  Hardware-type: ethernet, Mode: Layer 2, Address: B4-C7-99-5C-FA-2B
  Index: 2002, Metric: 1, MTU: 1500
  Speed: Admin Auto, Operational n/a, Maximum 1G
  Duplex: Admin Auto, Operational n/a
  Active-medium: n/a
  Switchport settings: access, access-vlan: 1
    Input packets 0, bytes 0, dropped 0
    Received 0 unicast, 0 broadcast, 0 multicast
    Input errors 0, runts 0, giants 0
    CRC 0, frame 0, fragment 0, jabber 0
    Output packets 501587, bytes 60935912, dropped 0
    Sent 3 unicast, 4613 broadcast, 496971 multicast
    Output errors 0, collisions 0, late collisions 0
    Excessive collisions 0

nx4500-5CFA2B(config)#

nx4500-5CFA8E(config)#show interface counters

<table>
<thead>
<tr>
<th>INTF</th>
<th>MAC</th>
<th>RX-PKTS</th>
<th>RX-BYTES</th>
<th>RX-DROP</th>
<th>TX-PKTS</th>
<th>TX-BYTES</th>
<th>TX-DROP</th>
</tr>
</thead>
<tbody>
<tr>
<td>vlan1</td>
<td>B4-C7-99-5C-FA-8E</td>
<td>976838</td>
<td>104430807</td>
<td>0</td>
<td>3320</td>
<td>105117</td>
<td>0</td>
</tr>
<tr>
<td>up1</td>
<td>B4-C7-99-5C-FA-8F</td>
<td>1000205</td>
<td>121668156</td>
<td>0</td>
<td>768931</td>
<td>77779941</td>
<td>0</td>
</tr>
<tr>
<td>up2</td>
<td>B4-C7-99-5C-FA-90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>vmif1</td>
<td>02-16-3E-05-00-01</td>
<td>279901</td>
<td>32766488</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>vmif2</td>
<td>02-16-3E-05-00-02</td>
<td>279901</td>
<td>32766488</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>vmif3</td>
<td>02-16-3E-05-00-03</td>
<td>279901</td>
<td>32766488</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>vmif4</td>
<td>02-16-3E-05-00-04</td>
<td>279901</td>
<td>32766488</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>vmif5</td>
<td>02-16-3E-05-00-05</td>
<td>279901</td>
<td>32766488</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

--More--
nx4500-5CFA8E(config)#
6.1.33 ip

> **show commands**

Displays IP related information

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show ip [arp|bgp|ddns|default-gateways|dhcp|dhcp-vendor-options|domain-name|
       extcommunity-list|igmp|interface|name-server|nat|ospf|route|routing]
show ip arp {{<VLAN-NAME>}} {on <DEVICE-NAME>}
show ip bgp {{<IP>|<IP/M>|community|community-list|filter-list|neighbors|on|paths|
       prefix-list|regexp|route-map|state|summary}
show ip ddns bindings {on <DEVICE-NAME>}
show ip dhcp [binding|networks|status]
show ip dhcp binding [manual] {on <DEVICE-NAME>}
show ip dhcp [networks|status] {on <DEVICE-NAME>}
show ip [default-gateways|dhcp-vendor-options|domain-name|name-server|routing]
   {on <DEVICE-NAME>}
show ip extcommunity-list [1-500|<NAME>]
show ip igmp snooping [mrouter|querier|vlan]
show ip igmp snooping [mrouter|querier] vlan <1-4095> {on <DEVICE-NAME>}
show ip igmp snooping vlan <1-4095> {{<IP>}} {on <DEVICE-NAME>}
show ip interface {{<INTERFACE-NAME>|brief|on}
show ip interface {{<INTERFACE-NAME>|brief}} {on <DEVICE-NAME>}
show ip nat translations verbose {on <DEVICE-NAME>}
show ip route {{<INTERFACE-NAME>|ge|me1|on|port-channel|pppoel|vlan|wwan1}
show ip route {{<INTERFACE-NAME>|ge <1-4>|me1|port-channel <1-2>|vlan <1-4094>|
       pppoe1|wwan1}} {on <DEVICE-NAME>}
show ip ospf {border-router|interface|neighbor|on|route|state}
show ip ospf {border-router|neighbor|route|on|state} {on <DEVICE-NAME>}
show ip ospf {interface} {vlan|on}
show ip ospf {interface} {vlan <1-4094>} {on <DEVICE-NAME>}
```

**NOTE:** The show ip ospf command is also available under the ‘profile’ and ‘device’ modes.

**Parameters**

- **show ip arp {{<VLAN-NAME>}} {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip arp</td>
<td>Displays Address Resolution Protocol (ARP) mappings</td>
</tr>
<tr>
<td>&lt;VLAN-NAME&gt;</td>
<td>Optional. Displays ARP mapping on a specified VLAN. Specify the VLAN name.</td>
</tr>
</tbody>
</table>
| **on <DEVICE-NAME>** | The following keyword is recursive and common to the 'vlan-name' parameter:  
|-----------------------|------------------------------------------------------------------------------------------------------------------|
|                       | • on <DEVICE-NAME> – Optional. Displays ARP configuration details on a specified device 
|                       | • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.  

- **show ip bgp** `<IP>/` `<IP/M>/` `community/` `community-list/` `filter-list/` `neighbors/` `on/` `paths/` `prefix-list/` `regexp/` `route-map/` `state/` `summary`  

- **ip bgp** Displays BGP routing table statistics based on the match criteria specified here. Routes matching the specified criteria are filtered. Use available options to filter the information displayed.  
  **Note:** This command is applicable to the RFS4000, RFS6000, NX45XX, NX65XX, NX9XXX model devices.  

- **<IP>** Optional. Filters routes matching the specified IP address  

- **<IP/M>** Optional. Filters routes matching the specified network  

- **community** Optional. Filters routes based on the community attribute specified. The options are:  
  • `AA:NN` – Filters routes based on the community number (`AA:` is the autonomous system number (ASN), `NN:` is the community number within the specified ASN)  
  • `local-as` – Filters routes carrying the local-as attribute (these routes are not sent outside the local AS)  
  • `no-advertise` – Filters routes carrying the no-advertise attribute (these routes are not advertised to any peers)  
  • `no-export` – Filters routes carrying no-export attribute (these routes are not exported to next AS)  

- **community-list** Optional. Displays routes that are members of communities included in the specified BGP community-list  
  • `<1-500>` – Specify the community-list number.  
  • `<WORD>` – Specify the community-list name.  

- **filter-list** Optional. Filters routes having AS-path matching the specified AS-path access list. Specify the AS-path ACL name.  

- **neighbors** Optional. Displays BGP neighbor details. Specify the IP address, to view a specific neighbor details. Use one of the following options to filter information:  
  • `advertised-routes` – Displays route information for routes advertised to the selected neighbor device  
  • `received-routes` – Displays route information for routes received from the selected neighbor device  
  • `routes` – Displays the route information for routes learned from the selected neighbor device  
  **Note:** If no neighbor IP address is specified, the system displays all neighbor-related routes on the logged device.  

- **on <DEVICE-NAME>** Optional. Displays BGP routing table statistics on a specified device  
  • `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.  

- **paths** Optional. Displays BGP path details
### show ip ddns bindings

**Syntax:**
```
show ip ddns bindings {on <DEVICE-NAME>}
```

**Description:**
Displays DDNS address bindings.
- **<DEVICE-NAME>** - Optional. Displays address bindings on a specified device.

### ip ddns

**Syntax:**
```
ip ddns
```

**Description:**
Displays Dynamic Domain Name Server (DDNS) configuration details.

### show ip dhcp [networks|status] {on <DEVICE-NAME>}

**Syntax:**
```
show ip dhcp [networks|status] {on <DEVICE-NAME>}
```

**Description:**
Displays DHCP server related details, such as network and status.
- **networks** - Displays DHCP server network details.
- **status** - Displays DHCP server status.
- **<DEVICE-NAME>** - Optional. Displays server status and network details on a specified device.

### ip dhcp bindings

**Syntax:**
```
ip dhcp bindings {on <DEVICE-NAME>}
```

**Description:**
Displays DHCP address bindings.
- **on <DEVICE-NAME>** - Optional. Displays DHCP address bindings on a specified device.

### show ip dhcp binding {manual} {(on <DEVICE-NAME>)}

**Syntax:**
```
show ip dhcp binding {manual} {(on <DEVICE-NAME>)}
```

**Description:**
Displays the DHCP server configuration details.
- **ip dhcp binding** - Displays DHCP address bindings.
- **manual** - Optional. Displays static DHCP address bindings.
- **<DEVICE-NAME>** - Optional. Displays DHCP address bindings on a specified device.

### show ip extcommunity-list [<1-500>|<NAME>]

**Syntax:**
```
show ip extcommunity-list [<1-500>|<NAME>]
```

**Description:**
Displays the specified extended community list details.
- **<1-500>** - Specify the extended community number from 1 - 500.
- **<NAME>** - Specify the extended community name.

**Note:** This command is applicable to the RFS4000, RFS6000, NX45XX, NX65XX, NX9XXX model devices.
### SHOW COMMANDS

**show ip** [default-gateways|dhcp-vendor-options|domain-name|name-server|routing] {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show ip default-gateways</td>
<td>Displays all learnt default gateways</td>
</tr>
<tr>
<td>show ip dhcp-vendor-options</td>
<td>Displays DHCP 43 parameters received from the DHCP server. This output includes the interface from which the option was learned.</td>
</tr>
<tr>
<td>show ip domain-name</td>
<td>Displays the DNS default domain</td>
</tr>
<tr>
<td>show ip name-server</td>
<td>Displays the DNS name server details</td>
</tr>
<tr>
<td>show ip routing</td>
<td>Displays routing status</td>
</tr>
</tbody>
</table>

**on <DEVICE-NAME>**

The following keywords are common to all of the above parameters:

- on <DEVICE-NAME> – Optional. Displays IP related information, based on the parameters passed, on a specified device
- <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

**show ip igmp snooping** [mrouter|querier] vlan <1-4095> {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip igmp snooping</td>
<td>Displays the IGMP snooping configuration</td>
</tr>
<tr>
<td>mrouter</td>
<td>Displays the IGMP snooping multicast router (mrouter) configuration</td>
</tr>
<tr>
<td>querier</td>
<td>Displays the IGMP snooping multicast querier configuration</td>
</tr>
</tbody>
</table>
| vlan <1-4095> {on <DEVICE-NAME>} | Displays the IGMP snooping multicast router configuration for a VLAN
- <1-4095> – Specify the VLAN ID from 1 - 4095.
- on <DEVICE-NAME> – Optional. Displays the IGMP snooping mrouter configuration on a specified device
  - <DEVICE-NAME> – Specify the name of the AP or wireless controller. |

**show ip igmp snooping vlan <1-4095> {<IP>} {on <DEVICE-NAME>}**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip igmp snooping</td>
<td>Displays the IGMP snooping configuration</td>
</tr>
</tbody>
</table>
| vlan <1-4095> {on <DEVICE-NAME>} | Displays the VLAN IGMP snooping configuration
- <1-4095> – Specify the VLAN ID from 1 - 4095. |
| <IP> | Optional. Specifies the multicast group IP address |

**on <DEVICE-NAME>**

The following keyword is recursive and common to the 'ip' parameter:

- on <DEVICE-NAME> – Optional. Displays configuration details on a specified device
- <DEVICE-NAME> – Specify the name of the AP or wireless controller. |

**show ip interface** {<INTERFACE-NAME>|brief} {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip interface</td>
<td>Displays an administrative and operational status of all layer 3 interfaces or a specified layer 3 interface</td>
</tr>
<tr>
<td>&lt;INTERFACE-NAME&gt;</td>
<td>Optional. Displays a specified interface status. Specify the interface name.</td>
</tr>
<tr>
<td>brief</td>
<td>Optional. Displays a brief summary of all interface status and configuration</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>\texttt{show ip nat translations verbose {on &lt;DEVICE-NAME&gt;}}</td>
<td>Displays detailed NAT translations on a specified device.</td>
</tr>
<tr>
<td>\texttt{ip nat translations}</td>
<td>Displays Network Address Translation (NAT) translations.</td>
</tr>
<tr>
<td>\texttt{verbose}</td>
<td>Displays detailed NAT translations on a specified device.</td>
</tr>
<tr>
<td>\texttt{show ip route {&lt;INTERFACE-NAME&gt;</td>
<td>ge &lt;1-4&gt;</td>
</tr>
<tr>
<td>\texttt{ip route}</td>
<td>Displays route table details for a specified interface. Specify the interface name.</td>
</tr>
<tr>
<td>\texttt{&lt;INTERFACE-NAME&gt;}</td>
<td>Optional. Displays GigabitEthernet interface route table details. Specify the GigabitEthernet interface index from 1 - 4.</td>
</tr>
<tr>
<td>\texttt{ge &lt;1-4&gt;}</td>
<td>Optional. Displays Port Channel interface route table details. Specify the Port Channel index from 1 - 2.</td>
</tr>
<tr>
<td>\texttt{me1}</td>
<td>Optional. Displays VLAN interface route table details. Select the VLAN interface ID from 1 - 4094.</td>
</tr>
<tr>
<td>\texttt{port-channel &lt;1-2&gt;}</td>
<td>Optional. Displays Point-to-point Protocol over Ethernet (PPPoE) interface route table details.</td>
</tr>
<tr>
<td>\texttt{vlan &lt;1-4094&gt;}</td>
<td>Optional. Displays Wireless WAN route table details.</td>
</tr>
<tr>
<td>\texttt{pppoe1}</td>
<td>Optional. Displays Wireless WAN route table details.</td>
</tr>
<tr>
<td>\texttt{wwan1}</td>
<td>Optional. Displays Wireless WAN route table details.</td>
</tr>
<tr>
<td>\texttt{on &lt;DEVICE-NAME&gt;}</td>
<td>The following keywords are recursive and common to all of the above parameters: on &lt;DEVICE-NAME&gt; – Displays route table details, based on the parameters passed, on a specified device.</td>
</tr>
<tr>
<td>\texttt{ip ospf}</td>
<td>Displays overall OSPF information.</td>
</tr>
<tr>
<td>\texttt{border-router}</td>
<td>Optional. Displays details of all the border routers connected.</td>
</tr>
</tbody>
</table>
SHOW COMMANDS 6-81

interface
{on| vlan <1-4094>} {on <DEVICE-NAME>}
Optional. Displays details of all the interfaces with OSPF enabled
• on <DEVICE-NAME> – Optional. Displays specified device details
• vlan <1-4094> – Displays VLAN interface details
• <DEVICE-NAME> – Specify the name of the AP or wireless controller.

neighbor
Optional. Displays an OSPF neighbors list

route
Optional. Displays OSPF routes information

on <DEVICE-NAME>
Optional. Displays overall OSPF information on a specified device
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

state
Optional. Displays an OSPF process state

on <DEVICE-NAME>
The following keywords are recursive and common to all of the above parameters:
• on <DEVICE-NAME> – Optional. Displays overall OSPF information, based on the
  parameters passed, on a specified device
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

Examples

rfs7000-6DCD4B(config)#show ip arp
<table>
<thead>
<tr>
<th>IP</th>
<th>MAC</th>
<th>INTERFACE</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.18.0.1</td>
<td>00-23-68-22-9D-58</td>
<td>vlan1</td>
<td>dynamic</td>
</tr>
<tr>
<td>192.168.13.10</td>
<td>00-02-B3-28-D1-55</td>
<td>vlan192</td>
<td>dynamic</td>
</tr>
<tr>
<td>192.168.13.2</td>
<td>00-0F-8F-19-BA-4C</td>
<td>vlan192</td>
<td>dynamic</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B(config)#

rfs7000-6DCD4B(config)#show ip interface brief
<table>
<thead>
<tr>
<th>INTERFACE</th>
<th>IP-ADDRESS/MASK</th>
<th>TYPE</th>
<th>STATUS</th>
<th>PROTOCOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>me1</td>
<td>192.168.0.1/24</td>
<td>primary</td>
<td>UP</td>
<td>down</td>
</tr>
<tr>
<td>vlan1</td>
<td>192.168.0.2/24</td>
<td>primary</td>
<td>UP</td>
<td>up</td>
</tr>
<tr>
<td>vlan192</td>
<td>192.168.13.111/24</td>
<td>primary</td>
<td>UP</td>
<td>up</td>
</tr>
</tbody>
</table>

rfs7000-6DCD4B(config)#

rfs7000-37FABE(config)#show ip route test
+-------------------------+------------------+------------+------------+-----------+-----------|
<table>
<thead>
<tr>
<th>DESTINATION</th>
<th>GATEWAY</th>
<th>FLAGS</th>
<th>INTERFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>157.235.208.0/24</td>
<td>direct</td>
<td>C</td>
<td>vlan4</td>
</tr>
<tr>
<td>172.16.10.0/24</td>
<td>direct</td>
<td>C</td>
<td>vlan1</td>
</tr>
<tr>
<td>default</td>
<td>172.16.10.9</td>
<td>CG</td>
<td>vlan1</td>
</tr>
</tbody>
</table>

Flags:  C - Connected  G - Gateway

rfs7000-37FABE(config)#

rfs7000-6DCD4B(config)#show ip route port-channel 1
<table>
<thead>
<tr>
<th>DESTINATION</th>
<th>GATEWAY</th>
<th>FLAGS</th>
<th>INTERFACE</th>
<th>METRIC</th>
<th>DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.0.0/24</td>
<td>direct</td>
<td>C</td>
<td>me1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>172.18.0.0/24</td>
<td>direct</td>
<td>C</td>
<td>vlan1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10.2.0.0/24</td>
<td>172.18.0.1</td>
<td>S</td>
<td>vlan1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>default</td>
<td>192.168.13.2</td>
<td>S</td>
<td>vlan192</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>192.168.13.0/24</td>
<td>direct</td>
<td>C</td>
<td>vlan192</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Flags:  C - Connected  G - Gateway  O - OSPF  B - BGP  S - Static
Gateway: N - Normalized Gateway Address

rfs7000-6DCD4B(config)#

rfs7000-6DCD4B(config)#show ip route vlan 1
**DESTINATION** | **GATEWAY** | **FLAGS** | **INTERFACE** | **METRIC** | **DISTANCE**
---|---|---|---|---|---
172.18.0.0/24 | direct | C | vlan1 | 0 | 0
10.2.0.0/24 | 172.18.0.1 | S | vlan1 | 0 | 1

Flags:  C - Connected  G - Gateway  O - OSPF  B - BGP  S - Static

Gateway: N - Normalized Gateway Address

---

**rfs7000-6DCD4B(config)#show ip route ge 1**

**DESTINATION** | **GATEWAY** | **FLAGS** | **INTERFACE** | **METRIC** | **DISTANCE**
---|---|---|---|---|---
192.168.0.0/24 | direct | C | me1 | 0 | 0
172.18.0.0/24 | direct | C | vlan1 | 0 | 0
10.2.0.0/24 | 172.18.0.1 | S | vlan1 | 0 | 1
default | 192.168.13.2 | S | vlan192 | 0 | 1
192.168.13.0/24 | direct | C | vlan192 | 0 | 0

Flags:  C - Connected  G - Gateway  O - OSPF  B - BGP  S - Static

Gateway: N - Normalized Gateway Address

---

**rfs7000-6DCD4B(config)#show ip dhcp status**

State of DHCP server: running
Interfaces: vlan2, vlan3

---

**rfs7000-37FABE(config)#show ip ospf state**

Maximum number of OSPF routes allowed: 9216
Number of OSPF routes received: 0
Ignore-count allowed: 5, current ignore-count: 0
Ignore-time 60 seconds, reset-time 360 seconds
Current OSPF process state: Running

---

**rfs7000-37FABE#show ip route vlan 1**

**DESTINATION** | **GATEWAY** | **FLAGS** | **INTERFACE**
---|---|---|---
172.16.10.0/24 | direct | C | vlan1

Flags:  C - Connected  G - Gateway  O - OSPF  S - Static

---

**rfs4000-882A17#show ip route on ap7131-0B863C**

**DESTINATION** | **GATEWAY** | **FLAGS** | **INTERFACE**
---|---|---|---
192.168.9.0/24 | 192.168.0.12 | O | vlan10
192.168.0.0/24 | direct | C | vlan10
192.168.5.0/24 | 192.168.0.12 | O | vlan10
192.168.6.0/24 | 192.168.0.12 | O | vlan10
172.20.15.0/24 | direct | C | vlan66
99.99.99.96/32 | 192.168.0.53 | S | vlan10
99.99.99.97/32 | 192.168.0.40 | S | vlan10

Flags:  C - Connected  G - Gateway  O - OSPF  S - Static
nx6500-31FABE(config)#show ip route ge 1

<table>
<thead>
<tr>
<th>DESTINATION</th>
<th>GATEWAY</th>
<th>FLAGS</th>
<th>INTERFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.16.12.0/24</td>
<td>direct</td>
<td>C</td>
<td>vlan3</td>
</tr>
<tr>
<td>172.16.11.0/24</td>
<td>direct</td>
<td>C</td>
<td>vlan2</td>
</tr>
<tr>
<td>172.16.10.0/24</td>
<td>direct</td>
<td>C</td>
<td>vlan1</td>
</tr>
</tbody>
</table>

Flags:  C - Connected  G - Gateway

nx6500-31FABE(config)#

nx6500-31FABE(config)#show ip routing
IP routing is enabled.
nx6500-31FABE(config)#

nx6500-31FABE(config)#show ip dhcp status
State of DHCP server: running
Interfaces: vlan2, vlan3

nx6500-31FABE(config)#

rfs4000-229D58#show ip dhcp-vendor-options

<table>
<thead>
<tr>
<th>ITEM</th>
<th>VALUE</th>
<th>INTERFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server Info</td>
<td>n/a</td>
<td>vlan400</td>
</tr>
<tr>
<td>Firmware Image File</td>
<td>n/a</td>
<td>vlan400</td>
</tr>
<tr>
<td>Config File</td>
<td>n/a</td>
<td>vlan400</td>
</tr>
<tr>
<td>Legacy Adoption Info</td>
<td>192.168.30.1</td>
<td>vlan300</td>
</tr>
<tr>
<td>AP Adoption Info</td>
<td>192.168.50.2</td>
<td>vlan500</td>
</tr>
<tr>
<td>AP Adoption Info</td>
<td>192.168.50.3</td>
<td>vlan500</td>
</tr>
<tr>
<td>Controller Adoption Info</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

rfs4000-229D58#
6.1.34 ip-access-list

show commands
Displays IP access list statistics

NOTE: This command is not available in the USER EXEC Mode.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show ip-access-list stats {<IP-ACCESS-LIST-NAME>|detail|on}
show ip-access-list stats {<IP-ACCESS-LIST-NAME>|detail <IP-ACCESS-LIST-NAME>}
{(on <DEVICE-NAME>)}

Parameters

- show ip-access-list stats {<IP-ACCESS-LIST-NAME>|detail <IP-ACCESS-LIST-NAME>}
{(on <DEVICE-NAME>)}

ip-access-list stats | Displays IP access list statistics
---|---
<IP-ACCESS-LIST-NAME> | Optional. Displays statistics for a specified IP access list. Specify the IP access list name.
detail <IP-ACCESS-LIST-NAME> | Optional. Displays detailed statistics for a specified IP access list. Specify the IP access list name.
on <DEVICE-NAME> | The following keyword is recursive and common to the 'IP-ACCESS-LIST-NAME' and 'detail' parameters:
on <DEVICE-NAME> – Optional. Displays all or a specified IP access list statistics on a specified device.
<DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

Examples

rfs7000-37FABE(config)#show ip-access-list stats
IP Access-list: # Restrict Management ACL #
  permit tcp any any eq ftp rule-precedence 1 Hitcount: 0
  permit tcp any any eq www rule-precedence 2 Hitcount: 4
  permit tcp any any eq ssh rule-precedence 3 Hitcount: 448
  permit tcp any any eq https rule-precedence 4 Hitcount: 0
  permit udp any any eq snmp rule-precedence 5 Hitcount: 0
  permit tcp any any eq telnet rule-precedence 6 Hitcount: 4
rfs7000-37FABE(config)#
The following example displays the 'auto-tunnel-acl' IP ACL configuration:

```bash
rfs4000-229D58(config)#ip access-list auto-tunnel-acl
rfs4000-229D58(config-ip-acl-auto-tunnel-acl)#show context
ip access-list auto-tunnel-acl
permit ip host 200.200.200.99 30.30.30.1/24 rule-precedence 2
permit ip host 200.200.200.99 any rule-precedence 3
rfs4000-229D58(config-ip-acl-auto-tunnel-acl)#
```

The following example displays the statistics for the 'auto-tunnel-acl' ACL:

```bash
rfs4000-229D58#show ip-access-list stats
IP Access-list: auto-tunnel-acl
    permit ip host 200.200.200.99 30.30.30.1/24 rule-precedence 2        Hitcount: 0
    permit ip host 200.200.200.99 any rule-precedence 3        Hitcount: 0
rfs4000-229D58#
```

```bash
nx6524-5483B0#show ip-access-list stats scaleacl | i 125
Hitcount: 893        Hardware
Hitcount: 3120        Hardware
```

```bash
    permit ip host 125.1.1.1 any rule-precedence 125
    permit ip host 125.2.1.1 any rule-precedence 346
    permit ip host 125.1.1.1 any rule-precedence 346
    permit ip host 125.2.1.1 any rule-precedence 346
Hitcount: 0        Hardware
Hitcount: 0        Hardware
```

```bash
nx6524-5483B0#
```
### 6.1.35 `ipv6`

#### show commands

Displays IPv6 related information

**Supported in the following platforms:**

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
show ipv6 [default-gateways|delegated-prefix|hop-limit|interface|mld|name-server|neighbors|route]
show ipv6 [default-gateways|delegated-prefix|hop-limit|name-server] {on <DEVICE-NAME>}
show ipv6 dhcp [client received-options|relay status|status] {on <DEVICE-NAME>}
show ipv6 interface {<IF-NAME>|brief} {on <DEVICE-NAME>}
show ipv6 mld snooping [mrouter vlan <1-4095>|querier vlan <1-4095>|vlan <1-4095>] {on <DEVICE-NAME>}
show ipv6 neighbors <VLAN-NAME> {on <DEVICE-NAME>}
show ipv6 route {<IF-NAME>|ge <1-X>|me1|port-channel <1-2>|pppoe1|serial <1-4>|te1e <1-4>|<1-1>|up|vlan <1-4095>|vmif <1-X>|wwan1|xge} {on <DEVICE-NAME>}
```

#### Parameters

- `ipv6` Displays IPv6 related information
- `default-gateways` Displays all learnt default gateways
- `delegated-prefix` Displays prefix delegation information
- `hop-limit` Displays the configured IPv6 hop count value
- `name-server` Displays DNS name servers
- `on <DEVICE-NAME>` This parameter is common to all of the above keywords.
  - `on <DEVICE-NAME>` – Optional. Displays the specified information on a device (access point, wireless controller, or service platform)
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

- `show ipv6 dhcp [client received-options|relay status|status] {on <DEVICE-NAME>}

```
ipv6                Displays IPv6 related information
dhcp                Displays DHCPv6 related information
client received-options Displays DHCP options received from clients
relay status        Displays the DHCPv6 relay agent’s running status
status              Displays the DHCPv6 stateless server daemon’s status. In case the DHCPv6 server is up and running, it also displays interface names.
```

---

**WiNG 5.8.4 CLI Reference Guide**

6-86
### SHOW COMMANDS

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`show ipv6 interface (&lt;IF-NAME&gt;</td>
<td>brief) {on &lt;DEVICE-NAME}&gt;`</td>
</tr>
<tr>
<td>`show ipv6 mld snooping [mrouter vlan &lt;1-4095&gt;</td>
<td>querier vlan &lt;1-4095&gt;</td>
</tr>
<tr>
<td><code>show ipv6 neighbors &lt;VLAN-NAME&gt; {on &lt;DEVICE-NAME&gt;}</code></td>
<td>Shows IPv6 neighbors on the specified VLAN.</td>
</tr>
<tr>
<td>`show ipv6 route (&lt;IF-NAME&gt;</td>
<td>ge &lt;1-X&gt;</td>
</tr>
</tbody>
</table>

*Note: `<DEVICE-NAME>` is a parameter that can be specified for some commands to display the specified information on a device.*

**ipv6** Displays IPv6 related information

**interface**

- `<IF-NAME>` (Optional): Specifies the interface name.
- `brief` (Optional): Displays a brief summary of IPv6 status and configuration on the specified interface.

**mld snooping**

- `<mrouter vlan <1-4095>|querier vlan <1-4095>|vlan <1-4095>` (Optional): Displays MLD snooping related information.

**mroute vlan**

- `<1-4095>` (Optional): Displays IPv6 multicast router information on the specified VLAN.

**querier vlan**

- `<1-4095>` (Optional): Displays IPv6 multicast querier information on the specified VLAN.

**vlan**

- `<1-4095>` (Optional): Displays MLD snooping related information on the specified VLAN.

**neighbors**

- `<VLAN-NAME>` (Optional): Displays IPv6 neighbors on the specified VLAN.

**route**

- `<IF-NAME>|ge <1-X>|me1|port-channel <1-2>|pppoe1|serial <1-4>|tel <1-4>|up|vlan <1-4095>|vmif|wwan1|xge>` (Optional): Displays IPv6 routes.

---

*Note: `<DEVICE-NAME>` is a parameter that can be specified for some commands to display the specified information on a device.*

**on <DEVICE-NAME>** This parameter is common to all of the above keywords.

- `<DEVICE-NAME>` (Optional): Specifies the name of the AP, wireless controller, or service platform.

**Access Point (AP)**, **Wireless Controller (WC)**, **Service Platform (SP)**
route | Displays IPv6 route table
---|---
<IF-NAME> | Optional. Displays IPv6 route table for the interface identified by the <IF-NAME> keyword
ge <1-X> | Optional. Displays IPv6 route table for the selected GigabitEthernet interface
me1 | Optional. Displays IPv6 route table for the FastEthernet interface
port-channel <1-2> | Optional. Displays IPv6 route table for the selected port-channel interface
ppoe1 | Optional. Displays IPv6 route table for the PPP over Ethernet interface
serial <1-4> | Optional. Displays IPv6 route table for the selected serial (slot) interface
Note: Applicable only for the NX4500, NX4524, NX6500, and NX6524.
t1e1 <1-4> <1-1> | Optional. Displays IPv6 route table for the selected t1e1 interface. Specify the slot ID and the port ID.
Note: Applicable only for the NX4500, NX4524, NX6500, and NX6524.
vlan <1-4095> | Optional. Displays IPv6 route table for the selected VLAN interface
up | Optional. Displays IPv6 route table for the WAN Ethernet interface
vmif <1-8> | Optional. Displays IPv6 route table for the selected virtual machine (VM) interface
Note: Applicable only for the NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, and NX9510.
wwan1 | Optional. Displays IPv6 route table for the wireless WAN interface
xge <1-4> | Optional. Displays IPv6 route table for the selected TenGigabitEthernet interface
Note: Applicable only for the NX9000, NX9500, and NX9510.
on <DEVICE-NAME> | This parameter is common to all of the above keywords.
• on <DEVICE-NAME> – Optional. Displays the specified information on a device (access point, wireless controller, or service platform)
• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

Examples

rfs7000-37FABE(config)#show ipv6 dhcp client received-options
DHCPv6 Client received options:
  Interface: None
  Server Identifier: None
  Client Identifier: None
  DNS Servers: None
  Domain Name: None
  Sip Servers: None
  Sip Domain Name: None
  Refresh Time: None
  Server Preference: None
  Vendor Options: None
rfs7000-37FABE(config)#
<table>
<thead>
<tr>
<th>DESTINATION</th>
<th>GATEWAY</th>
<th>FLAGS</th>
<th>INTERFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000:abcd::/64</td>
<td>fe80::300:1</td>
<td>S</td>
<td>vlan300</td>
</tr>
<tr>
<td>default</td>
<td>fe80::11:1</td>
<td>R</td>
<td>vlan11</td>
</tr>
<tr>
<td>4444:1111::/64</td>
<td>direct</td>
<td>C</td>
<td>vlan1</td>
</tr>
</tbody>
</table>

Flags:  
C - Connected  
G - Gateway  
S - Static  
R - IPv6-RA

rfs4000-229D58(config)# show ipv6 default-gateways

<table>
<thead>
<tr>
<th>Source: IPv6-RA</th>
<th>Gateway-address : fe80::100:1</th>
<th>Preference: medium</th>
<th>Status : not-monitored</th>
<th>Insatllled : NO</th>
<th>Interface : vlan100</th>
<th>Remaining Lifetime: 1471 sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source: IPv6-RA</td>
<td>Gateway-address : fe80::1:2</td>
<td>Preference: low</td>
<td>Status : not-monitored</td>
<td>Insatllled : NO</td>
<td>Interface : vlan1</td>
<td>Remaining Lifetime: 1488 sec</td>
</tr>
<tr>
<td>Source: IPv6-RA</td>
<td>Gateway-address : fe80::11:1</td>
<td>Preference: high</td>
<td>Status : reachable</td>
<td>Insatllled : YES</td>
<td>Interface : vlan11</td>
<td>Remaining Lifetime: 1471 sec</td>
</tr>
</tbody>
</table>

rfs4000-229D58#
6.1.36 ipv6-access-list

Displays IPv6 access list statistics

NOTE: This command is not available in the USER EXEC Mode.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show ipv6-access-list stats <IPv6-ACCESS-LIST-NAME> {(on <DEVICE-NAME>)}

Parameters
- show ipv6-access-list stats <IPv6-ACCESS-LIST-NAME> {(on <DEVICE-NAME>)}

Examples

rfs6000-6DB5D4#show ipv6-access-list stats
IPV6 Access-list: test
  deny ipv6 any any rule-precedence 20        Hitcount: 4
rfs6000-6DB5D4#
6.1.37 l2tpv3

Show commands

Displays a Layer 2 Tunnel Protocol Version 3 (L2TPV3) session information

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
l2tpv3 {on|tunnel|tunnel-summary}
l2tpv3 {on <DEVICE-NAME>}
l2tpv3 {tunnel <L2TPV3-TUNNEL-NAME>} {session <L2TPV3-SESSION-NAME>}
   {(on <DEVICE-NAME>)}
l2tpv3 {tunnel-summary} {down|on|up}
l2tpv3 {tunnel-summary} {on <DEVICE-NAME>}
l2tpv3 {tunnel-summary} {down|up} {on <DEVICE-NAME>}
```

Parameters
- **l2tpv3 {on <DEVICE-NAME>}**
  - Displays a L2TPv3 tunnel and session details or summary
    - on <DEVICE-NAME> – Optional. Displays L2TPv3 information on a specified access point or wireless controller
    - <DEVICE-NAME> – Specify the name of AP, wireless controller, or service platform.

- **l2tpv3 {tunnel <L2TPV3-TUNNEL-NAME>} {session <L2TPV3-SESSION-NAME>}**
  - Displays a L2TPv3 tunnel and session details or summary
    - <L2TPV3-TUNNEL-NAME> – Specify the L2TPv3 tunnel name.
    - <L2TPV3-SESSION-NAME> – Specify the session name.

- **on <DEVICE-NAME>**
  - The following keyword is recursive and common to the ‘session <L2TPV3-SESSION-NAME>’ parameter.
    - on <DEVICE-NAME> – Optional. Displays a L2TPv3 tunnel and session details, based on the parameters passed, on a specified device.
    - <DEVICE-NAME> – Specify the name of AP, wireless controller, or service platform.
l2tpv3 {tunnel-summary} {on <DEVICE-NAME>}

Displays L2TPv3 tunnel and session details or summary

Note: For an L2TPv3 tunnel over Auto IPSec, the tunnel status is displayed as: Established (secured by ipsec)

l2tpv3 tunnel-summary {on <DEVICE-NAME>}

Optional. Displays L2TPv3 tunnel summary

- on <DEVICE-NAME> – Optional. Displays a L2TPv3 tunnel summary on a specified device
- <DEVICE-NAME> – Specify the name of AP, wireless controller, or service platform.

Examples

ap7131-11B6C4#show l2tpv3 tunnel-summary
---------------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>Sl No</th>
<th>Tunnel Name</th>
<th>Tunnel State</th>
<th>Estd/Total Sessions</th>
<th>Encapsulation Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>testTunnel</td>
<td>Established (secured by ipsec)</td>
<td>1/1</td>
<td>IP</td>
</tr>
</tbody>
</table>
---------------------------------------------------------------------------------------
Total Number of Tunnels 1

ap7131-11B6C4#

ap7131-11B6C4#show l2tpv3

---------------------------------------------------------------------------------------
Tunnel Name : testTunnel
  Control connection id : 2238970979
  Peer Address : 30.1.1.1
  Local Address : 30.1.1.30
  Encapsulation Protocol : IP
  MTU : 1460
  Peer Host Name : rfss
  Peer Vendor Name : Example Company
  Peer Control Connection ID : 322606389
  Tunnel State : Established (secured by ipsec)
  Establishment Criteria : always
  Sequence number of the next msg to the peer : 29
  Expected sequence number of the next msg from the peer : 42
  Sequence number of the next msg expected by the peer : 29
  Retransmission count : 0
  Reconnection count : 0
  Uptime : 0 days 1 hours 2 minutes 47 seconds
---------------------------------------------------------------------------------------
Session Name : session1
  VLANs : 30
  Pseudo Wire Type : Ethernet_VLAN
  Serial number for the session : 6
  Local Session ID : 129538998
  Remote Session ID : 8151374
  Size of local cookie (0, 4 or 8 bytes) : 0

---------------------------------------------------------------------------------------
First word of local cookie : 0
Second word of local cookie : 0
Size of remote cookie (0, 4 or 8 bytes) : 0
First word of remote cookie : 0
Second word of remote cookie : 0
Session state : Established
Remote End ID : 444
Trunk Session : 1
Native VLAN tagged : Enabled
Native VLAN ID : 0
Number of packets received : 0
Number of bytes received : 0
Number of packets sent : 0
Number of bytes sent : 0
Number of packets dropped : 0

ap7131-11B6C4#
6.1.38 ldap-agent

▲ show commands

Displays an LDAP agent's join status (join status to a LDAP server domain)

Use this command When LDAP is specified the external resource (as opposed to local RADIUS resources) to validate PEAP-MS-CHAP v2 authentication requests, user credentials, and password information needs to be made available locally to successfully connect to the external LDAP server. Up to two LDAP Agents (primary and secondary external resources) can be defined as external resources for PEAP-MS-CHAP v2 authentication requests.

NOTE: This command is not available in the USER EXEC Mode.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show ldap-agent join-status {on <DEVICE-NAME>}

Parameters

- show ldap-agent join-status {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>ldap-agent</th>
<th>Displays LDAP agent related configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>join-status</td>
<td>Displays if the LDAP agent has successfully joined a LDAP server’s domain</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays if the LDAP agent has successfully joined a specified LDAP server’s domain.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; — Specify the name of the device running the LDAP server (access point, wireless controller, or service platform).</td>
</tr>
</tbody>
</table>

Examples

rfs6000-81701D#show ldap-agent join-status
Primary LDAP Server's agent join-status : Joined domain TEST.
Secondary LDAP Server's agent join-status : Not Configured
rfs6000-81701D#
### 6.1.39 licenses

Show commands

Displays installed licenses and usage information

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show licenses {borrowed|lent}
```

**Parameters**

- `show licenses {borrowed|lent}`

| licenses {borrowed|lent} | Displays installed licenses and usage information
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- borrowed – Optional. Displays information on licenses borrowed</td>
</tr>
<tr>
<td></td>
<td>- lent – Optional. Displays information on licenses lent</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

The WiNG HM network defines a three-tier structure, consisting of multiple wireless sites managed by a single Network Operations Center (NOC) controller. The NOC and the site controllers constitute the first and second tiers of the hierarchy respectively. The site controllers in turn adopt and manage access points that form the third tier of the hierarchy. The site controllers may or may not be grouped to form clusters.

At the time of adoption, access points and adaptive access points are provided license by the adopting controller. These license packs can be installed on both the NOC and site controllers. When a AP/AAP is adopted by a controller, the controller pushes a license on to the device. At this point the various possible scenarios are:

- **AP/AAP license packs installed on the NOC controller only.**
  - The NOC controller provides the site controllers with the AP licenses, ensuring that per platform limits are not exceeded.

- **AP/AAP license packs installed on the NOC and site controllers.**
  - The site controller uses its installed licenses and, in case of a shortage, the site controller borrows additional licenses from the NOC. If the NOC controller is unable to allocate sufficient licenses, the site controller unadopts some of the AP/AAPs.

- **AP/AAP license packs installed on one controller within a cluster.**
  - The site controller shares its installed and borrowed licenses with other cluster controllers.

**Examples**

```
rfs4000-229D58#show licenses
Serial Number : 9184521800027
Device Licenses:
  AP-LICENSE
    String : DEFAULT-6AP-LICENSE
    Value  : 6
    Borrowed : 0
    Total   : 6
    Used    : 0
  AAP-LICENSE
    String :
    Value  : 0
    Borrowed : 0
    Total : 0
    Used  : 0
```
The following example shows the show > licenses command output on a NOC controller:

```
nx4500-5CFA2B#show licenses
Serial Number : 6283529900127

Device Licenses:
  AP-LICENSE
    String : 41a5a30ee9bb0bd78e943dba0a36ac34d3c66c956ef1f449d89f1c28beb032ac9747a8f0c9f98f
    Value  : 1
  AAP-LICENSE
    String : 41a5a30ee9bb0bd7f8d421c001f7c9cb3cd66c956ef1f41960aa2a030abb41ac9747a8f0c9f98f
    Value  : 1

Total Licenses:
  AP-LICENSE
    Value : 263
    Used : 0
  AAP-LICENSE
    Value : 329
    Used : 3

Cluster Licenses:
  AP-LICENSE
    Value : 257
    Used : 0
  AAP-LICENSE
    Value : 257
    Used : 2

Active Members:

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>SERIAL</th>
<th>LIC TYPE</th>
<th>VALUE</th>
<th>LENT</th>
<th>TOTAL</th>
<th>NO.APS</th>
<th>NO.AAPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-15-70-5C-FA-3B</td>
<td>6283529900127</td>
<td>AP</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>00-15-70-5C-FA-3B</td>
<td>6283529900127</td>
<td>AAP</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Non-Active Members:

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>SERIAL</th>
<th>LIC TYPE</th>
<th>VALUE</th>
<th>LENT</th>
<th>TOTAL</th>
<th>VALIDITY (HRS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-15-70-81-70-1D</td>
<td>7295520400017</td>
<td>AP</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>93 days, 5 hours</td>
</tr>
<tr>
<td>00-15-70-81-70-1D</td>
<td>7295520400017</td>
<td>AAP</td>
<td>51</td>
<td>0</td>
<td>51</td>
<td>93 days, 5 hours</td>
</tr>
</tbody>
</table>
```

nx4500-5CFA2B#
In the following example, the ‘VALIDITY(HRS)’ column specifies the validity period, in days and hours, of a lent license. On a NOC controller, a ‘VALIDITY(HRS)’ value of ‘current’ implies that the site controller is currently adopted. Whereas, a numerical ‘VALIDITY(HRS)’ value indicates the days and hours the lent license is valid for a site controller that is not reachable.

rfs7000-37FABE#show licenses lent

<table>
<thead>
<tr>
<th>MAC</th>
<th>HOST-NAME</th>
<th>TYPE</th>
<th>LENT</th>
<th>BORROWER-MAC</th>
<th>BORROWER-HOST-NAME</th>
<th>VALIDITY(HRS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-15-70-37-FA-BE</td>
<td>rfs7000-37FABE</td>
<td>AP</td>
<td>1</td>
<td>00-00-00-04-04-0A</td>
<td>rfs4000-04040A</td>
<td>93 days, 5 hours</td>
</tr>
<tr>
<td>00-15-70-37-FA-BE</td>
<td>rfs7000-37FABE</td>
<td>AAP</td>
<td>1</td>
<td>00-00-00-04-04-0A</td>
<td>rfs4000-04040A</td>
<td>93 days, 5 hours</td>
</tr>
<tr>
<td>00-15-70-37-FA-BE</td>
<td>rfs7000-37FABE</td>
<td>AAP</td>
<td>1</td>
<td>00-00-00-04-04-0B</td>
<td>rfs4000-04040B</td>
<td>93 days, 5 hours</td>
</tr>
<tr>
<td>00-15-70-37-FA-BE</td>
<td>rfs7000-37FABE</td>
<td>AAP</td>
<td>1</td>
<td>00-00-00-04-04-0D</td>
<td>rfs4000-04040D</td>
<td>current</td>
</tr>
<tr>
<td>00-15-70-37-FA-BE</td>
<td>rfs7000-37FABE</td>
<td>AAP</td>
<td>2</td>
<td>00-23-68-88-1E-4B</td>
<td>rfs4000-881E4B</td>
<td>current</td>
</tr>
<tr>
<td>00-15-70-81-70-1D</td>
<td>rfs6000-81701D</td>
<td>AP</td>
<td>1</td>
<td>00-23-68-88-1E-4B</td>
<td>rfs4000-881E4B</td>
<td></td>
</tr>
</tbody>
</table>

rfs4000-881E4B#show licenses borrowed

<table>
<thead>
<tr>
<th>MAC</th>
<th>HOST-NAME</th>
<th>TYPE</th>
<th>BORROWED</th>
<th>VALIDITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-15-70-37-FD-89</td>
<td>rfs7000-37FD89</td>
<td>AAP</td>
<td>2</td>
<td>99 days, 23 hours</td>
</tr>
<tr>
<td>00-15-70-81-70-1D</td>
<td>rfs6000-81701D</td>
<td>AP</td>
<td>1</td>
<td>99 days, 23 hours</td>
</tr>
</tbody>
</table>

The following examples show the ‘show > licenses’ output on the devices participating in the process:

nx9500-6C8809>show licenses lent

<table>
<thead>
<tr>
<th>MAC</th>
<th>HOST-NAME</th>
<th>TYPE</th>
<th>LENT</th>
<th>BORROWER-MAC</th>
<th>BORROWER-HOST-NAME</th>
<th>VALIDITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4-C7-99-6C-88-09</td>
<td>nx9500-6C8809</td>
<td>AAP</td>
<td>1</td>
<td>00-15-70-81-74-2D</td>
<td>rfs6000-81742D</td>
<td>57 days, 1 hour</td>
</tr>
<tr>
<td>B4-C7-99-6C-88-09</td>
<td>nx9500-6C8809</td>
<td>AAP</td>
<td>2</td>
<td>B4-C7-99-6D-CD-4B</td>
<td>rfs7000-6DCD4B</td>
<td>57 days, 2 hours</td>
</tr>
</tbody>
</table>

nx9500-6C8809>

rfs7000-6DCD4B>show licenses borrowed

<table>
<thead>
<tr>
<th>MAC</th>
<th>HOST-NAME</th>
<th>TYPE</th>
<th>BORROWED</th>
<th>VALIDITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4-C7-99-6C-88-09</td>
<td>nx9500-6C8809</td>
<td>AAP</td>
<td>2</td>
<td>56 days, 6 hours</td>
</tr>
</tbody>
</table>
6.1.40 lldp

show commands

Displays Link Layer Discovery Protocol (LLDP) information

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show lldp [neighbors|report]
show lldp neighbors {on <DEVICE-NAME>}
show lldp report {detail|on}
show lldp report {detail} {(on <DEVICE-OR-DOMAIN-NAME>)}

Parameters

- show lldp neighbors {on <DEVICE-NAME>}
- show lldp report {detail} {(on <DEVICE-OR-DOMAIN-NAME>)}

Examples

rfs7000-37FABE(config)#show lldp neighbors
-------------------------
Chassis ID: 00-23-68-22-9D-58
System Name: L3-Router
Platform: RFS-4010-00010-WR, Version 5.8.4.0-008D
Capabilities: Bridge  Router
Enabled Capabilities: Bridge  Router
Local Interface: ge1, Port ID (outgoing port): ge2
TTL: 148 sec
Management Addresses: 10.2.0.1,172.18.0.1
rfs7000-37FABE(config)#
6.1.41 logging

show commands

Displays the network’s activity log

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
show logging {on <DEVICE-NAME>}
```

Parameters

- `on <DEVICE-NAME>` – Optional. Executes the command on a specified device.
- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

Examples

```
nx9500-6C8809#show logging

Logging module: enabled
Aggregation time: disabled
Console logging: level debugging
Monitor logging: disabled
Buffered logging: level warnings
Syslog logging: level warnings
Facility: local7

Log Buffer (1666269 bytes):

May 14 05:30:23 2015: nx9500-6C8809 : %DIAG-4-PWRSPLY_FAIL: Power supply failure, no longer redundant
May 14 05:30:13 2015: nx9500-6C8809 : %DEVICE-4-OFFLINE: Device B4-C7-99-74-B4-5C(ap8132-74B45C) is offline, last seen:10 minutes ago on switchport rfs6000-6DB5D4:ge1
May 14 05:20:16 2015: nx9500-6C8809 : %DIAG-4-PWRSPLY_FAIL: Power supply failure, no longer redundant
May 14 05:19:43 2015: nx9500-6C8809 : %DEVICE-4-OFFLINE: Device B4-C7-99-74-B4-5C(ap8132-74B45C) is offline, last seen:10 minutes ago on switchport rfs6000-380649:ge1
--More--
nx9500-6C8809#
```
6.1.42 mac-access-list

show commands

Displays MAC access list statistics

NOTE: This command is not present in USER EXEC mode.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show mac-access-list stats {<MAC-ACCESS-LIST-NAME>|on}
show mac-access-list stats {<MAC-ACCESS-LIST-NAME>} {(on <DEVICE-NAME>)}

Parameters

mac-access-list stats | Displays MAC access list statistics

- <MAC-ACCESS-LIST-NAME> | Optional. Displays statistics for a specified MAC access list. Specify the MAC access list name.
  Note: The system displays all configured ACL statistics if no ACL name is specified.

on <DEVICE-NAME> | Optional. Displays all or a specified MAC access list statistics on a specified device
- <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

Examples

nx6524-5483B0#show mac-access-list stats scalemacacl | i 311
permit D0-67-E5-3F-C0-00 FF-FF-FF-FF-F0-00 host 00-1E-EC-F2-0A-76 rule-precedence 311
Hitcount: 0 Hardware Hitcount: 0

nx6524-5483B0#
6.1.43  **mac-address-table**

> show commands

Displays MAC address table entries

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show mac-address-table {on <DEVICE-NAME>}
```

**Parameters**

- **show mac-address-table {on <DEVICE-NAME>}**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mac-address-table</td>
<td>Displays MAC address table entries</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays MAC address table entries on a specified device</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-6DCD4B(config)#show mac-address-table
BRIDGE VLAN PORT   MAC               STATE
-------------------------------------------------------------------
1 192 ge2           00-23-68-13-9B-34 forward
1 1 ge1             00-23-68-22-9D-58 forward
1 192 ge2           00-A0-F8-68-D5-65 forward
1 192 ge2           B4-C7-99-5C-FA-2B forward
1 192 ge2           3C-CE-73-F4-47-83 forward
1 1 ge1             00-23-68-22-9D-5A forward
1 192 ge2           00-15-70-38-06-49 forward
1 192 ge2           00-0F-8F-19-BA-4C forward
1 192 ge2           B4-C7-99-58-72-58 forward
1 192 ge2           00-23-68-11-E6-C4 forward
1 192 ge2           B4-C7-99-6C-88-09 forward
1 192 ge2           5C-0E-8B-18-10-91 forward
1 192 ge2           B4-C7-99-5C-FA-8E forward
1 ext-vlan          00-A0-F8-67-1D-17 forward
1 192 ge2           00-23-68-88-0D-A7 forward
1 192 ge2           00-04-96-43-4C-AA forward
1 192 ge2           00-15-70-37-FD-F2 forward
1 192 ge2           B4-C7-99-74-B4-5C forward
1 192 ge2           B4-C7-99-6D-B5-D4 forward
1 192 ge2           00-02-B3-28-D1-55 forward
Total number of MACs displayed: 20
```

```
rfs7000-6DCD4B(config)#
```
6.1.44 mac-auth

Displays details of wired ports that have MAC address authentication enabled

Use this command to view MAC authentication configuration and authentication state. The command displays the current authentication state of the wired host, the authorization state of the Ge1 port, and the wired hosts’ MAC address. The port status displays as Authorized if the wired host has successfully authenticated and Not Authorized if the wired host has not authenticated or has failed MAC authentication.

For more information on enabling MAC address authentication on a wired port, see `mac-auth`.

Supported in the following platforms:
- Access Points — AP6511
- Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax

```
show mac-auth {all|interface <INTERFACE-NAME>|ge <1-5>|port-channel <1-3>|t1e1 <1-4>|up <1-2>|vmif <1-X>|xge <1-4>|} {on <DEVICE-NAME>}
```

Parameters

- `show mac-auth {all|interface <INTERFACE-NAME>|ge <1-5>|port-channel <1-3>|t1e1 <1-4>|up <1-2>|vmif <1-X>|xge <1-4>|} {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mac-auth</td>
<td>Displays MAC authentication related information for all interfaces or all interfaces</td>
</tr>
<tr>
<td>all</td>
<td>Optional. Displays MAC authentication related information for all interfaces</td>
</tr>
</tbody>
</table>
| interface [<INTERFACE-NAME>|ge <1-5>|port-channel <1-3>|t1e1 <1-4>|up <1-2>|vmif <1-X>|xge <1-4>] | Optional. Displays MAC authentication related information for a specified interface. Specify the interface using one of the following options:
  - `<INTERFACE-NAME>` – Selects the interface identified by the `<INTERFACE-NAME>` keyword
  - `ge <1-5>` – Selects the GigabitEthernet interface identified by the index number
  - `port-channel <1-3>` – Selects the port channel interface identified by the index number
  - `t1e1 <1-4>` – Selects the layer 2 interface (Ethernet port)
  - `up <1-2>` – Selects the WAN Ethernet interface identified by the index number
  - `vmif <1-X>` – Selects the `virtual machine interface` (VMIF) identified by the index number
  - `xge <1-4>` – Selects the TenGigabitEthernet interface identified by the index number

- `on <DEVICE-NAME>`

The following keywords are common to the 'all' and 'interface' parameters:
- `on <DEVICE-NAME>` – Optional. Displays MAC authentication related information on a specified device
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

**Note:** When the 'on' keyword is used exclusively, without the 'all' and 'interface' options, the system displays MAC authentication related information for interfaces configured on the specified device.
Examples
rfs4000-229D58(config)#show mac-auth all
AAA-Policy is none

Mac Auth info for interface GE1
-----------------------------------
Mac Auth Enabled
Mac Auth Not Authorized

Mac Auth info for interface GE2
-----------------------------------
Mac Auth Disabled
Mac Auth Not Authorized

Mac Auth info for interface GE3
-----------------------------------
Mac Auth Disabled
Mac Auth Not Authorized

Mac Auth info for interface GE4
-----------------------------------
Mac Auth Disabled
Mac Auth Authorized

Mac Auth info for interface GE5
-----------------------------------
Mac Auth Disabled
Mac Auth Not Authorized

Mac Auth info for interface UP1
-----------------------------------
Mac Auth Disabled
Mac Auth Not Authorized
rfs4000-229D58(config)#
6.1.45 **mac-auth-clients**

> **show commands**

Displays MAC authenticated clients

Supported in the following platforms:
- Access Points — AP6511
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```
show mac-auth-clients [all|interface]
show mac-auth-clients all {on <DEVICE-NAME>}
show mac-auth-clients interface {<INF-NAME>|ge <1-X>|port-channel <1-2>|vmif <1-8>|xge <1-4>}
```

**Parameters**
- **show mac-auth-clients all {on <DEVICE-NAME>}
- show mac-auth-clients interface {<INF-NAME>|ge <1-X>|port-channel <1-2>|vmif <1-8>|xge <1-4>}

<table>
<thead>
<tr>
<th>mac-auth-clients</th>
<th>Displays MAC authenticated clients based on the parameters passed. The options are: all and interface.</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>Displays MAC authenticated clients for all interfaces</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays MAC authenticated clients for all interfaces on a specified device</td>
</tr>
</tbody>
</table>

- **show mac-auth-clients interface {<INF-NAME>|ge <1-X>|port-channel <1-2>|vmif <1-8>|xge <1-4>}

<table>
<thead>
<tr>
<th>mac-auth-clients</th>
<th>Displays MAC authenticated clients based on the parameters passed. The options are: all and interface.</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface</td>
<td>Displays MAC authenticated clients for the specified interface. Select the interface type from the following options:</td>
</tr>
<tr>
<td>[INF-NAME&gt;</td>
<td>ge &lt;1-X&gt;</td>
</tr>
<tr>
<td>ge &lt;1-X&gt;</td>
<td>Optional. Displays MAC authenticated clients for the selected GigabitEthernet interface. Specify the GE interface index from 1 - X. This will vary for different device types.</td>
</tr>
<tr>
<td>port-channel &lt;1-2&gt;</td>
<td>Optional. Displays MAC authenticated clients for the selected port channel interface. Specify the port channel interface index from 1 - 2.</td>
</tr>
<tr>
<td>vmif &lt;1-8&gt;</td>
<td>Optional. Displays MAC authenticated clients for the selected virtual machine (VM) interface. Specify the VM interface index from 1 - 8.</td>
</tr>
<tr>
<td>xge &lt;1-4&gt;</td>
<td>Optional. Displays MAC authenticated clients for the selected TenGigabitEthernet interface. Specify the interface index from 1 - 4.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>on &lt;DEVICE-NAME&gt;</th>
<th>Optional. Displays MAC authenticated clients for the specified interface on a specified device</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
<td>-- Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>
Examples
	nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#show mac-auth-clients interface ge 1
-----------------------------------------------
| MAC | STATE       | INTERFACE |
-----------------------------------------------
Total number of MACs displayed: 0

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#
6.1.46 mint

> show commands

Displays MiNT protocol related statistics

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show mint [config|dis|id|info|known-adopters|links|lsp|lsp-db|mlcp|neighbors|route|
stats|tunnel-controller|tunneled-vlans]
```

```
show mint [config|id|info|known-adopters|route|stats|tunneled-vlans] {on <DEVICE-NAME>}
```

```
show mint [dis|links|neighbors|tunnel-controller] {details} {(on <DEVICE-NAME>)}
```

```
show mint lsp
```

```
show mint lsp-db {details <MINT-ADDRESS>} {(on <DEVICE-NAME>)}
```

```
show mint mlcp {history} {(on <DEVICE-NAME>)}
```

**Parameters**

- show mint [config|id|info|known-adopters|route|stats|tunneled-vlans] {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>mint</th>
<th>Displays MiNT protocol information based on the parameters passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>config</td>
<td>Displays MiNT configuration</td>
</tr>
<tr>
<td>id</td>
<td>Displays local MiNT ID</td>
</tr>
<tr>
<td>info</td>
<td>Displays MiNT status</td>
</tr>
<tr>
<td>known-adopters</td>
<td>Displays known, possible, or reachable adopters</td>
</tr>
<tr>
<td>route</td>
<td>Displays MiNT route table details</td>
</tr>
<tr>
<td>stats</td>
<td>Displays MiNT related statistics</td>
</tr>
<tr>
<td>tunneled-vlans</td>
<td>Displays MiNT tunneled VLAN details</td>
</tr>
</tbody>
</table>

- show mint [dis|links|neighbors|tunnel-controller] {details} {(on <DEVICE-NAME>)}

<table>
<thead>
<tr>
<th>mint</th>
<th>Displays MiNT protocol information based on the parameters passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>dis</td>
<td>Displays MiNT network Designated Intermediate Systems (DISes) and Ethernet Virtualization Interconnects (EVISes)</td>
</tr>
<tr>
<td>links</td>
<td>Displays MiNT networking link details</td>
</tr>
<tr>
<td>neighbors</td>
<td>Displays adjacent MiNT peer details</td>
</tr>
</tbody>
</table>
SHOW COMMANDS

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tunnel-controller</td>
<td>Displays details of MiNT VLAN network tunnel wireless controllers for extended VLAN load balancing</td>
</tr>
</tbody>
</table>
| details \{(on <DEVICE-NAME>)\} | The following keywords are common to the 'dis', 'links', 'neighbors', and 'tunnel-controller' parameters:  
  • details – Optional. Displays detailed MiNT information  
  • on <DEVICE-NAME> – Optional. This is a recursive parameter, which displays MiNT information on a specified device.  
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| show mint lsp     | Displays MiNT protocol information based on the parameters passed                              |
| lsp               | Displays this router's MiNT Label Switched Paths (LSPs)                                          |
| show mint lsp-db  | Details of MiNT VLAN network tunnel wireless controllers for extended VLAN load balancing       |
| mint              | Displays MiNT protocol information based on the parameters passed                              |
| lsp-db            | Displays MiNT LSP database entries                                                              |
| details <MINT-ADDRESS> | Optional. Displays detailed MiNT LSP database entries                                              |
| on <DEVICE-NAME> | The following keyword is recursive and common to the 'details' parameter:  
  • on <DEVICE-NAME> – Optional. Displays MiNT LSP database entries on a specified device  
  • <DEVICE-NAME> – Specify the name of the AP or wireless controller                        |
| show mint mlcp    | Displays IPv4 and IPv6 MiNT Link Creation Protocol (MLCP) status                                |
| mlcp              | Displays IPv4 and IPv6 MiNT Link Creation Protocol (MLCP) status                                |
| history           | Optional. Displays MLCP client history                                                         |
| on <DEVICE-NAME>  | The following keyword is recursive and common to the 'history' parameter:  
  • on <DEVICE-NAME> – Optional. Displays MLCP client history on a specified device  
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.   |

**Examples**

```
rfs7000-37FABE(config)#show mint stats
0 L1 neighbors
L1 LSP DB size 1 LSPs (0 KB)
1 L1 routes
Last SPF's took 0s
SPF (re)calculated 1 times.
levels 1
base priority 180
dis priority 180
rfs7000-37FABE(config)#
```
rfs7000-37FABE(config)#show mint lsp
id 70.37.fa.be, level 1, seqnum 18640, 0 adjacencies, 0 extended-vlans,
expires in 1145 seconds, republish in 722 seconds, changed True,
ext-vlan FDB pri 0, 180 bytes

rfs7000-37FABE(config)#show mint lsp-db
1 LSPs in LSP-db of 70.37.FA.BE:
LSP 70.37.FA.BE at level 1, hostname "rfs7000-37FABE", 0 adjacencies, seqnum 84941

rfs7000-37FABE(config)#show mint route
Destination : Next-Hop(s)
70.37.FA.BE : 70.37.FA.BE via self

rfs7000-37FABE(config)#show mint known-adopters
70.37.FA.BE

rfs7000-37FABE(config)#show mint config
Base priority 180
DIS priority 180
Control priority 180
UDP/IP Mint encapsulation port 24576
Global Mint MTU 1500

ap7532-15E6E4#show mint mlcp
MLCP VLAN state: MLCP_DONE
Potential VLAN links: 1
All VLANs were scanned 2 times
Link created on VLAN 1
MLCP IP state: MLCP_DISCOVERING
Potential L3 Links:
192.168.1.43

MLCP IP Hello Interval: 15s(default), Adjacency hold time: 46s(default)
MLCP VLAN Hello Interval: 4s(default), Adjacency hold time: 13s(default)
ap7532-15E6E4#
6.1.47 nsight

Displays NSight module related statistics and also displays the database server status (reachable or not)

Supported in the following platforms:
   • Service Platforms — NX9000, NX9500, NX9510, NX9600

Syntax
show nsight status

Parameters
• show nsight status

<table>
<thead>
<tr>
<th>nsight</th>
<th>Displays the NSight module related status, such as:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• NSight is enabled or not on the device</td>
</tr>
<tr>
<td></td>
<td>• NSight report and aggregation daemon is running or not</td>
</tr>
<tr>
<td></td>
<td>• NSight alarm daemon is running or not</td>
</tr>
<tr>
<td></td>
<td>• NSight server daemon is running or not</td>
</tr>
<tr>
<td></td>
<td>• Database server is reachable or not</td>
</tr>
</tbody>
</table>

Examples
nx9500-6C8809(config)#show nsight status
Nsight is enabled
Nsight report and aggregation daemon is running
Nsight alarm daemon is running
Nsight server daemon is running
Database server is not reachable
nx9500-6C8809(config)#
# 6.1.48 ntp

## show commands

Displays *Network Time Protocol* (NTP) information. NTP enables clock synchronization within a network.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

## Syntax

```
show ntp [associations|status]
```

```
show ntp [associations {detail|on}|status {on <DEVICE-NAME>}]  
```

### Parameters

- `show ntp [associations {detail|on}|status {on <DEVICE-NAME>}]`

## ntp associations

**detail/on**

Displays existing NTP associations. The interaction between the controller or service platform and a SNTP server constitutes an association. SNTP associations are of two kinds:
- peer associations - where a controller or service platform synchronizes to another system or allows another system to synchronize to it, or
- server associations - where only the controller or service platform synchronizes to the SNTP resource, not the other way around.

- **detail** – Optional. Displays detailed NTP associations
- **on <DEVICE-NAME>** – Optional. Displays NTP associations on a specified device

**<DEVICE-NAME>**

Specify the name of the AP, wireless controller, or service platform.

**Note:** If the ‘on’ keyword is used without the ‘detail’ keyword, the system displays a summary of existing NTP associations on the specified device or RF Domain.

## ntp status

**on <DEVICE-NAME>**

Displays the performance (status) information relative to the NTP association status. Use this command to view the access point, controller, or service platform’s current NTP resource.

- **on <DEVICE-NAME>** – Optional. Displays NTP association status on a specified device

**<DEVICE-NAME>**

Specify the name of the AP, wireless controller, or service platform.

## Examples

```
nx9500-6C8809#show ntp associations
```

```
+-----------------------+-----------------+----------+---------+---------+---------+---------+---------+----------+
| STATUS   | NTP SERVER IP ADDR | REF CLOCK | IP ADDR | STRATUM | WHEN | POLL | REACH | DELAY |
|----------|-------------------+------------+----------+---------+------|------|-------+--------+--------|
|          | 12.12.12.12       | INIT       | 16       | -       | 1024 | 0    | 0      | 0.0    |
| 0.0      | 15937.5           | -          | -        | 0       | 0.0  | -    | -      | -      |
|          | 11.11.11.11       | INIT       | 16       | -       | 1024 | 0    | 0      | 0.0    |
| 0.0      | 15937.5           | -          | -        | 0       | 0.0  | -    | -      | -      |
|          | 10.10.10.10       | INIT       | 16       | -       | 1024 | 0    | 0      | 0.0    |
| 0.0      | 15937.5           | -          | -        | 0       | 0.0  | -    | -      | -      |
|----------|-------------------+------------+----------+---------+------|------|-------+--------+--------|

STATUS Notation: * master (synced), # master (unsynced), + selected, - candidate, - configured
nx9500-6C8809#

nx9500-6C8809#show ntp status

<table>
<thead>
<tr>
<th>ITEM</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leap</td>
<td>Clock is unsynchronized</td>
</tr>
<tr>
<td>Stratum</td>
<td>16</td>
</tr>
<tr>
<td>Reference</td>
<td>INIT</td>
</tr>
<tr>
<td>Frequency</td>
<td>0.0000 Hz</td>
</tr>
<tr>
<td>Precision</td>
<td>$2^{-20}$</td>
</tr>
<tr>
<td>Reference time</td>
<td>00000000.00000000 (Feb 07 11:58:16 UTC 2036)</td>
</tr>
<tr>
<td>Clock Offset</td>
<td>0.000 msec</td>
</tr>
<tr>
<td>Root delay</td>
<td>0.000 msec</td>
</tr>
<tr>
<td>Root Dispersion</td>
<td>0.000 msec</td>
</tr>
</tbody>
</table>

nx9500-6C8809#
6.1.49 password-encryption

Displays password encryption status (enabled/disabled)

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
show password-encryption status
```

Parameters

- `show password-encryption status`

Examples

```
rfs7000-37FABE(config)#show password-encryption status
Password encryption is enabled
rfs7000-37FABE(config)#
```
6.1.50 **pppoe-client**

*show commands*

Displays *Point-to-Point Protocol over Ethernet* (PPPoE) client information

Use this command to view PPPoE statistics derived from access to high-speed data and broadband networks. PPPoE uses standard encryption, authentication, and compression methods as specified by the PPPoE protocol. PPPoE enables point-to-points connection to an ISP over existing Ethernet interface.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show pppoe-client [configuration|status] {on <DEVICE-NAME>}
```

**Parameters**

- `show pppoe-client [configuration|status] {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pppoe-client</td>
<td>Displays PPPoE client information (configuration and status)</td>
</tr>
<tr>
<td>configuration</td>
<td>Displays detailed PPPoE client configuration</td>
</tr>
<tr>
<td>status</td>
<td>Displays detailed PPPoE client status</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following keywords are common to ‘configuration’ and ‘status’ parameters:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays detailed PPPoE client status or configuration on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config)#show pppoe-client configuration
PPPoE Client Configuration:
+-------------------------------------------|
| Mode           : Disabled                  |
| Service Name   :                          |
| Auth Type      : pap                       |
| Username       :                          |
| Password       :                          |
| Idle Time      : 600                       |
| Keepalive      : Disabled                  |
| Local n/w      : vlan1                     |
| Static IP      : 0.0.0.0                   |
| MTU            : 1492                      |
+-------------------------------------------|
```

```
rfs7000-37FABE(config)#
```
6.1.51 privilege

show commands

Displays a device's existing privilege level

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show privilege

Parameters

None

Examples

rfs7000-37FABE(config)#show privilege
Current user privilege: superuser
rfs7000-37FABE(config)#
6.1.52 radius

Displays the amount of access time consumed and the amount of access time remaining for all guest users configured on a RADIUS server.

Every captive portal guest user can access the captive portal for a specified duration. This results in following three scenarios:

- Scenario 1: Access duration not specified (in this case the default of 1440 minutes is applied)
- Scenario 2: Access duration is specified and is greater than 0
- Scenario 3: Access duration is specified and equals to 0 (in this case the guest user has unlimited access)

In all the three scenarios the access time consumed is the duration for which the guest user has logged. But the access time remaining varies. It is calculated as follows:

- Scenarios 1 & 2 - It is the lesser of the following two values: difference between the configured access duration and the time consumed AND the time until user account expiration.
- Scenario 3 - It is the time until user account expiration

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
show radius [guest-users|server]
show radius guest-users {brief|<GUEST-USER-NAME>}
show radius server
```

Parameters

- `show radius guest-users {brief|<GUEST-USER-NAME>}`

| radius guest-users {brief|<GUEST-USER-NAME>} | Displays RADIUS server’s guest user’s access details: total time for which the user has logged in, and the amount of access time remaining. |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| • brief – Displays the total number of guest users provided RADIUS access |
| • <GUEST-USER-NAME> – Optional. Provide the name of the guest user (whose access details are to be viewed). If no name is provided, the system displays details of all guest users who have successfully logged in at least once. |

Use this command in the captive-portal context to view time and data statistics for guest user(s) having bandwidth-based or time-based vouchers configured. In such a scenario, the system displays the following information: data configured, data remaining, configured and current bandwidths (for both downlink and uplink), time configured, and time remaining. If bandwidth-based voucher is not applicable to a guest user, the data configured and data remaining values are displayed as ‘unlimited’. The bandwidth columns are blank. If time-based voucher is not applicable to a guest user, the only value displayed is the time remaining (which is the time till the expiration of the guest user’s account).

**Note:** For more information on configuring bandwidth-based and time-based vouchers, see `user`. 


show radius server

<table>
<thead>
<tr>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs4000-229D58#show radius guest-users</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TIME (min:sec)</th>
<th>USED</th>
<th>REMAINING</th>
<th>GUEST USER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00</td>
<td>9:00</td>
<td>time9</td>
<td></td>
</tr>
<tr>
<td>0:00</td>
<td>5:00</td>
<td>time5</td>
<td></td>
</tr>
<tr>
<td>0:00</td>
<td>15:00</td>
<td>time15</td>
<td></td>
</tr>
<tr>
<td>0:00</td>
<td>305416:35</td>
<td>notime</td>
<td></td>
</tr>
<tr>
<td>2:31</td>
<td>7:29</td>
<td>time10</td>
<td></td>
</tr>
</tbody>
</table>

rfs4000-229D58#

The following example shows a RADIUS user pool with guest users having bandwidth-based, time-based, bandwidth and time based, and no bandwidth or time based vouchers:

rfs4000-229D58(config-captive-portal-wdws)#show context
radius-user-pool-policy wdws
user time_and_data password 0 both group wdws guest expiry-time 12:00 expiry-date 12/31/2015 access-duration 8000 data-limit 500 committed-downlink 3000 committed-uplink 2000 reduced-downlink 1000 reduce4
user neither password 0 nine group wdws guest expiry-time 12:00 expiry-date 12/31/2015 data-limit 125 committed-downlink 1000 committed-uplink 800 reduced-downlink 500 reduced-uplink 400
user time_only password 0 time group wdws guest expiry-time 12:00 expiry-date 12/31/2015 access-duration 5000

rfs4000-229D58(config-captive-portal-wdws)#

The following example shows the captive portal access details for the above mentioned RADIUS user pool users:

rfs4000-229D58(config-captive-portal-wdws)#show radius guest-users

<table>
<thead>
<tr>
<th>GUEST USER</th>
<th>TIME (DD:HH:MM:SS)</th>
<th>DATA (kilobytes)</th>
<th>BANDWIDTH (kbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>time_and_data</td>
<td>till expiry 221:19:44:54</td>
<td>unlimited</td>
<td>unlimited</td>
</tr>
<tr>
<td>neither</td>
<td>till expiry 221:19:44:54</td>
<td>unlimited</td>
<td>unlimited</td>
</tr>
<tr>
<td>data_only</td>
<td>till expiry 221:19:44:54</td>
<td>128000</td>
<td>127587</td>
</tr>
<tr>
<td>time_only</td>
<td>3:11:20:00</td>
<td>3:11:19:47</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

Current time: 17:15:07

rfs4000-229D58(config-captive-portal-wdws)
6.1.53 **reload**

- **show commands**

Displays scheduled reload information for a specific device

---

**NOTE:** This command is not present in the USER EXEC mode.

---

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show reload {on <DEVICE-OR-DOMAIN-NAME>}
```

**Parameters**

- `show reload {on <DEVICE-OR-DOMAIN-NAME>}`

---

**reload {on <DEVICE-OR-DOMAIN-NAME>}**

Displays scheduled reload information for a specified device

- on <DEVICE-OR-DOMAIN-NAME> – Optional. Displays configuration on a specified device
- <DEVICE-OR-DOMAIN-NAME> – Specify the name of the AP, wireless controller, service platform, or RF Domain.

**Examples**

```
rfs7000-37FABE(config)#show reload
No reload is scheduled.
rfs7000-37FABE(config)#
```
6.1.54 rf-domain-manager

- show commands
  Displays RF Domain manager selection details

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show rf-domain-manager {on <DEVICE-OR-DOMAIN-NAME>}

Parameters

- show rf-domain-manager {on <DEVICE-OR-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>rf-domain-manager</th>
<th>Displays RF Domain manager selection details</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Displays RF Domain manager selection details on a specified device or domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config)#show rf-domain-manager
RF Domain RFDOMAIN_TechPubsLabLan
RF Domain Manager:
  ID: 70.37.FA.BE
  Priority: 180
  Has IP MiNT link
  Has wired MiNT links
Device under query:
  Priority: 180
  Has IP MiNT links
  Has wired MiNT links
rfs7000-37FABE(config)#
6.1.55 role

show commands
Displays role based firewall information

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
show role [ldap-stats|wireless-clients]
show role [ldap-stats|wireless-clients] {on <DEVICE-NAME>}

Parameters
- show role [ldap-stats|wireless-clients] {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>role ldap-stats</th>
<th>Displays LDAP server status and statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>role wireless-clients</td>
<td>Displays clients associated with roles</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following parameters are common to the 'ldap-stats' and 'wireless-clients' keywords:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays clients associated with roles on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, and service platform.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config)#show role wireless-clients
No ROLE statistics found.
rfs7000-37FABE(config)#
6.1.56 route-maps

Displays route map statistics for defined device routes

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
show route-maps {on <DEVICE-NAME>}

Parameters
- show route-maps {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>route-maps</th>
<th>Displays configured route map statistics for all defined routes</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays route map statistics on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; — Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config)#show route-maps
rfs7000-37FABE(config)#
6.1.57 **rtls**

> show commands

Displays *Real Time Location Service* (RTLS) statistics for access points contributing locationing information supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show rtls [aeroscout|ekahau] {<MAC/HOSTNAME>} {(on <DEVICE-OR-DOMAIN-NAME>)}
```

**Parameters**

- `show rtls [aeroscout|ekahau] {<MAC/HOSTNAME>} {(on <DEVICE-OR-DOMAIN-NAME>)}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>rtls</code></td>
<td>Displays access point RTLS statistics</td>
</tr>
<tr>
<td><code>aeroscout</code></td>
<td>Displays access point Aeroscout statistics</td>
</tr>
<tr>
<td><code>ekahau</code></td>
<td>Displays access point Ekahau statistics</td>
</tr>
<tr>
<td><code>&lt;MAC/HOSTNAME&gt;</code></td>
<td>Optional. Displays Aeroscout or Ekahau statistics for a specified access point. Specify the MAC address or hostname of the access point.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>The following keyword is recursive and common to ‘Aeroscout’ and ‘Ekahau’ parameters:</td>
</tr>
</tbody>
</table>

- `on <DEVICE-OR-DOMAIN-NAME>` — Optional. Displays Aeroscout or Ekahau statistics on a specified device or domain.
- `<DEVICE-OR-DOMAIN-NAME>` — Specify the name of the AP, wireless controller, service platform, or RF Domain.

**Examples**

```
rfs4000-229D58(config)#show rtls aeroscout

Aeroscout Engine IP: 0.0.0.0 Port: 0
Send Count : 0
Recv Count : 0
Tag Reports : 0
Nacks : 0
Acks : 0
Lbs : 0
AP Status : 0
AP Notif : 0
Send Err : 0
Errmsg Count : 0

Total number of APs displayed: 1
rfs4000-229D58(config)#
```
### 6.1.58 running-config

**Show commands**

Displays configuration files (where all configured MAC and IP access lists are applied to an interface)

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show running-config {aaa-policy|application|application-policy|association-acl-policy|
    auto-provisioning-policy|capture-portal-policy|device|database-client-policy|
    database-policy|device|device-overrides|dhcp-server-policy|dhcpv6-server-policy|
    ex3500-management-policy|ex3500-qos-class-map-policy|ex3500-qos-policy-map|
    exclude-devices|firewall-policy|guest-management-policy|hide-encrypted-values|
    include-factory|interface|ip-access-list|ipv6-access-list|mac-access-list|
    management-policy|meshpoint|nsight-policy|profile|radio-qos-policy|rf-domain|
    roaming-assist-policy|rtl-server-policy|schedule-policy|smart-cache-policy|
    smart-rf-policy|url-filter|url-list|web-filter-policy|wlan|wlan-qos-policy}
```

```
show running-config {aaa-policy|application|application-policy|association-acl-policy|
    auto-provisioning-policy|capture-portal-policy|device|database-client-policy|
    database-policy|device|device-overrides|dhcp-server-policy|dhcpv6-server-policy|
    ex3500-management-policy|ex3500-qos-class-map-policy|ex3500-qos-policy-map|
    firewall-policy|management-policy|nsight-policy|radio-qos-policy|
    roaming-assist-policy|rtl-server-policy|schedule-policy|smart-cache-policy|
    smart-rf-policy|url-filter|url-list|web-filter-policy|wlan|wlan-qos-policy}
```

```
show running-config application <APPLICATION-NAME>
```

```
show running-config exclude-devices
```

```
show running-config {device [<MAC>|self]} {include-factory}
```

```
show running-config {device-overrides {brief}}
```

```
show running-config {hide-encrypted-values {exclude-devices|include-factory}}
```

```
show running-config {include-factory}
```

```
show running-config {interface} {<INTERFACE-NAME>|ge|include-factory|me|port-channel|
    pppoe1|vlan|wwan1}
```

```
show running-config {interface} {<INTERFACE-NAME>|ge <1-4>|include-factory|
    me1|port-channel <1-2>|pppoe1|vlan <1-4094>|wwan1} {include-factory}
```

```
show running-config {ip-access-list <IP-ACCESS-LIST-NAME>|
    ipv6-access-list <IPv6-ACCESS-LIST-NAME>|mac-access-list <MAC-ACCESS-LIST-NAME} {include-factory}
```

```
show running-config {meshpoint <MESHPOINT-NAME>} {include-factory}
```

```
show running-config {profile [anyap|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|
    rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600} <PROFILE-NAME>}
```

```
show running-config {rf-domain <DOMAIN-NAME>} {include-factory}
```

```
show running-config {wlan <WLAN-NAME>} {include-factory}
```

```
show running-config url-filter <URL-FILTER-NAME>
```

```
show running-config url-list <URL-LIST-NAME> {include-factory}
```
### Parameters


| running-config | Optional. Displays current running configuration
| device [<MAC>|self] | Optional. Displays device configuration
| hide-encrypted-values {exclude-devices|include-factory} | Optional. Replaces all encrypted passwords with the standard characters ****** in the show > running-config output
| device-overrides brief | Optional. Displays overrides applied at the device’s configuration

**Note:** If the command is executed without a keyword, the system displays the entire running configuration.

- **<POLICY-TYPE> <POLICY-NAME>** Optional. Select the policy type, for example, aaa-policy, auto-provisioning-policy, captive-portal-policy, etc. and then specify the policy name. The system displays the selected policy’s configuration.
  - *(include-factory)*

- **include-factory** The following keyword is common to all policies:
  - *(include-factory)* – Optional. Includes factory defaults

- **show running-config** *(device [<MAC]/self]) {include-factory}*

- **running-config** Displays current running configuration

- **device [<MAC]/self]** Optional. Displays device configuration
  - *(<MAC>)* – Displays a specified device configuration. Specify the MAC address of the device.
  - *(self)* – Displays the logged device’s configuration

- **include-factory** The following keyword is common to the ‘<MAC>’ and ‘self’ parameters:
  - *(include-factory)* – Optional. Displays factory defaults

- **show running-config** *(hide-encrypted-values {exclude-devices|include-factory})* 

- **running-config** Displays current running configuration

- **hide-encrypted-values {exclude-devices|include-factory}** Optional. Replaces all encrypted passwords with the standard characters ****** in the show > running-config output
  - *(exclude-devices)* – Optional. Excludes devices from the running configuration displayed
  - *(include-factory)* – Optional. Includes factory default values in the running configuration displayed

- **show running-config** *(device-overrides {brief})*

- **running-config** Displays current running configuration

- **device-overrides brief** Optional. Displays overrides applied at the device’s configuration
  - *(brief)* – Optional. Displays a brief summary of device overrides
### show running-config {exclude-devices}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>running-config</td>
<td>Displays current running configuration</td>
</tr>
<tr>
<td>exclude-devices</td>
<td>Optional. Excludes device configuration details from the running configuration displayed</td>
</tr>
</tbody>
</table>

### show running-config {include-factory}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>running-config</td>
<td>Displays current running configuration</td>
</tr>
<tr>
<td>include-factory</td>
<td>Optional. Includes factory defaults</td>
</tr>
</tbody>
</table>

### show running-config {interface} {<INTERFACE-NAME>|ge <1-4>|include-factory|me1|port-channel <1-2>|pppoe1|vlan <1-4094>|wwan1} {include-factory}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>running-config</td>
<td>Displays current running configuration</td>
</tr>
<tr>
<td>interface</td>
<td>Optional. Displays interface configuration</td>
</tr>
<tr>
<td>&lt;INTERFACE-NAME&gt;</td>
<td>Optional. Displays a specified interface configuration. Specify the interface name.</td>
</tr>
<tr>
<td>ge &lt;1-4&gt;</td>
<td>Optional. Displays GigabitEthernet interface configuration</td>
</tr>
<tr>
<td>me1</td>
<td>Optional. Displays FastEthernet interface configuration</td>
</tr>
<tr>
<td>port-channel &lt;1-2&gt;</td>
<td>Optional. Displays port channel interface configuration. Specify the port channel interface index from 1 - 2.</td>
</tr>
<tr>
<td>pppoe1</td>
<td>Optional. Displays PPP over Ethernet interface configuration</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Displays VLAN interface configuration</td>
</tr>
<tr>
<td>wwan1</td>
<td>Optional. Displays Wireless WAN interface configuration</td>
</tr>
<tr>
<td>include-factory</td>
<td>The following keyword is common to all interfaces:</td>
</tr>
<tr>
<td>Optional. Includes factory defaults</td>
<td></td>
</tr>
</tbody>
</table>

### show running-config {ip-access-list <IP-ACCESS-LIST-NAME>|ipv6-access-list <IPv6-ACCESS-LIST-NAME>|mac-access-list <MAC-ACCESS-LIST-NAME}} {include-factory}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>running-config</td>
<td>Optionally, you can execute the command along with one of the associated keywords to view the running configuration for that top-level object. To view a access-list and its configuration, specify the ACL type and provide the ACL name. <strong>Note:</strong> If the command is executed without a keyword, the system displays the entire running configuration.</td>
</tr>
<tr>
<td>&lt;ACL-TYPE&gt; &lt;IP/IPv6/MAC-ACCESS-LIST-NAME&gt;</td>
<td>Optional. Select the ACL type, for example, ip-access-list, ipv6-access-list, or mac-access-list, and then specify the ACL name. The system displays the selected ACL’s configuration.</td>
</tr>
</tbody>
</table>

- <IP/IPv6/MAC-ACCESS-LIST-NAME> – Specify the name of the ACL (should be existing and configured).
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show running-config</code></td>
<td>Displays current running configuration</td>
</tr>
<tr>
<td><code>meshpoint &lt;MESHPOINT-NAME&gt;</code></td>
<td>Optional. Displays meshpoint configuration</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;MESHPOINT-NAME&gt;</code> – Specify the meshpoint name</td>
</tr>
<tr>
<td><code>include-factory</code></td>
<td>Optional. Includes factory defaults along with running configuration details</td>
</tr>
<tr>
<td></td>
<td>• <code>show running-config {meshpoint &lt;MESHPOINT-NAME&gt;} {include-factory}</code></td>
</tr>
<tr>
<td><code>profile &lt;DEVICE-TYPE&gt; &lt;PROFILE-NAME&gt;</code></td>
<td>Optional. Displays current configuration for a specified profile. Select the device type, and then specify the profile name.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-TYPE&gt;</code> – Select the device type. The options are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP832, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX55XX, NX75XX, NX9000, NX9600.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;PROFILE-NAME&gt;</code> – Specify the profile name for the selected <code>&lt;DEVICE-TYPE&gt;</code>.</td>
</tr>
<tr>
<td></td>
<td>Note: Select the ‘anyap’ option to view the running configuration of any type of device.</td>
</tr>
<tr>
<td><code>include-factory</code></td>
<td>Optional. This parameter is common to all profiles. When selected, it includes factory defaults in the output.</td>
</tr>
<tr>
<td></td>
<td>• `show running-config {profile [anyap</td>
</tr>
<tr>
<td><code>rf-domain &lt;DOMAIN-NAME&gt;</code></td>
<td>Optional. Displays current configuration for a RF Domain</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DOMAIN-NAME&gt;</code> – Displays current configuration for a specified RF Domain. Specify the RF Domain name.</td>
</tr>
<tr>
<td><code>include-factory</code></td>
<td>Optional. Includes factory defaults</td>
</tr>
<tr>
<td></td>
<td>• <code>show running-config {rf-domain &lt;DOMAIN-NAME&gt;} {include-factory}</code></td>
</tr>
<tr>
<td><code>wlan &lt;WLAN-NAME&gt;</code></td>
<td>Optional. Displays current configuration for a WLAN</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;WLAN-NAME&gt;</code> – Displays current configuration for a specified WLAN. Specify the WLAN name.</td>
</tr>
<tr>
<td><code>include-factory</code></td>
<td>Optional. Includes factory defaults</td>
</tr>
<tr>
<td></td>
<td>• <code>show running-config wlan &lt;WLAN-NAME&gt; {include-factory}</code></td>
</tr>
<tr>
<td></td>
<td>• <code>show running-config url-filter &lt;URL-FILTER-NAME&gt;</code></td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>show running-config url-list &lt;URL-LIST-NAME&gt;</code></td>
<td>Displays current configuration for the URL list identified by the <code>&lt;URL-LIST-NAME&gt;</code> keyword.</td>
</tr>
<tr>
<td><code>include-factory</code></td>
<td>Optional. Includes factory defaults.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config)#show running-config device self
!
firewall ratelimit-trust policy default
!
management-policy default
telnet
http server
ssh
!
firewall-policy default
!
mint-security-policy the_policy
  rejoin-timeout 35
!
device-discover-policy default
!
rfs7000 00-15-70-37-FA-BE
hostname rfs7000-37FABE
no country-code
bridge vlan 3
bridge vlan 5
ip dhcp trust
  ip igmp snooping querier version 2
  ip igmp snooping querier max-response-time 3
  ip igmp snooping querier timer expiry 89
  wep-shared-key-auth
radius nas-identifier test
--More--
rfs7000-37FABE(config)
```

```
x6500-31FABE(config)#show running-config device 11-22-33-44-55-66 include-factory
!
radio-qos-policy default
  wmm best-effort aifsn 3
  wmm video txop-limit 94
  wmm video aifsn 1
  wmm video cw-min 3
  wmm video cw-max 4
  wmm voice txop-limit 47
  wmm voice aifsn 1
  wmm voice cw-min 2
--More--
x6500-31FABE(config)#
```
rfs7000-6DCD4B#show running-config profile ap81xx default-ap81xx
profile ap81xx default-ap81xx
  autoinstall configuration
  autoinstall firmware
  crypto ikev1 policy ikev1-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ikev2 policy ikev2-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
  crypto ikev1 remote-vpn
  crypto ikev2 remote-vpn
  crypto auto-ipsec-secure
  crypto remote-vpn-client
  interface radio1
  interface radio2
  interface radio3
  interface gel
  interface ge2
  interface vlan1
  --More--
rfs7000-6DCD4B#

nx9500-6C8809#show running-config url-filter URL_FILTER_Shopping include-factory
url-filter URL_FILTER_Shopping
  no description
  blacklist category-type p2p precedence 20 description description
  blacklist category-type news-sports-general category shopping precedence 10 description description
  blockpage path internal
  blockpage internal org-name Your Organization Name
  blockpage internal org-signature Your Organization Name, All Rights Reserved.
  blockpage internal header The requested URL could not be retrieved.
  blockpage internal footer If you have any questions please contact your IT department.
  blockpage internal content The site you have attempted to reach may be considered inappropriate for access.
  no blockpage internal main-logo
  no blockpage internal small-logo
  no blockpage external
nx9500-6C8809#

nx9500-6C8809#show running-config url-list AllowedShopping
url-list AllowedShopping
  url ebay.com depth 10
  url amazon.com depth 10
nx9500-6C8809#

nx9500-6C8809#show running-config application Bing
application Bing
  app-category streaming
  use url-list Bing
nx9500-6C8809#
6.1.59 session-changes

Displays configuration changes made in the current session

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show session-changes

Parameters

None

Examples

rfs7000-37FABE(config)#show session-changes

No changes in this session

rfs7000-37FABE(config)#
### 6.1.60 session-config

**show commands**

Lists active open sessions on a device

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show session-config {exclude-devices|include-factory}
```

**Parameters**

- `session-config {exclude-devices|include-factory}`

| session-config {exclude-devices|include-factory} | Displays current session configuration |
|--------------------------------------------------|--------------------------------------|
| `exclude-devices` – Optional. Excludes device configuration details from the output |
| `include-factory` – Optional. Includes factory defaults |

**Examples**

```
x9500-6C8809(config)#show session-config

Configuration of NX9500 version 5.8.4.0-008D
 version 2.5
 client-identity-group default
  load default-fingerprints
  ip access-list BROADCAST-MULTICAST-CONTROL
   permit tcp any any rule-precedence 10 rule-description "permit all TCP traffic"
   permit udp any eq 67 any eq dhcpc rule-precedence 11 rule-description "permit DHCP replies"
   deny udp any range 137 138 any range 137 138 rule-precedence 20 rule-description "deny windows netbios"
   deny ip any 224.0.0.0/4 rule-precedence 21 rule-description "deny IP multicast"
   deny ip any host 255.255.255.255 rule-precedence 22 rule-description "deny IP local broadcast"
   permit ip any any rule-precedence 100 rule-description "permit all IP traffic"

mac access-list PERMIT-ARP-AND-IPv4
   permit any any type ip rule-precedence 10 rule-description "permit all IPv4 traffic"
--More--
x9500-6C8809(config)#
```
6.1.61 sessions

show commands

Displays CLI sessions initiated on a device

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`show sessions all {on <DEVICE-NAME>}`

Parameters

- `show sessions all {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>sessions</th>
<th>Displays CLI sessions initiated on a device</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>Displays all sessions including internal</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. This is a recurring keyword and is common to the 'all' parameter. Displays CLI sessions on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

Examples

```
nx9500-6C8809# show sessions
INDEX COOKIE NAME START TIME FROM ROLE
1 2        snmp     2016-04-29 12:06:13 127.0.0.1 superuser
2 3        snmp2    2016-04-29 12:06:13 127.0.0.1 superuser
3 15       admin    2016-04-29 14:36:37 192.168.100.193 superuser
```

nx9500-6C8809#
6.1.62 site-config-diff

Displays the difference in site configuration available on the NOC and a site.

The WiNG HM network defines a three-tier structure, consisting of multiple wireless sites managed by a single Network Operations Center (NOC) controller. The NOC controller constitutes the first and the site controllers constitute the second tier of the hierarchy. The site controllers may or may not be grouped to form clusters. The site controllers in turn adopt and manage access points that form the third tier of the hierarchy.

NOC controllers possess default site configuration details. Overrides applied at the site level result in a mismatch of configuration at the site and the default site configuration available on the NOC controller. Use this command to view this difference.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

NOTE: This command returns an output only when executed on a NOC controller.

Syntax

```
show site-config-diff <SITE-NAME>
```

Parameters

- `site-config-diff <SITE-NAME>`

  | Displays the configuration difference for the specified site |
  | <SITE-NAME> | | | |

Examples

```
nx9500-6C874D#show site-config-diff 5C-0E-8B-18-06-F4
----- Config diff for switch 5C-0E-8B-18-06-F4 ----
rfs6000 5C-0E-8B-18-06-F4
interface pppoel
  no shutdown
nx9500-6C874D#
```
6.1.63  **smart-rf**

### show commands

Displays **Self-Monitoring At Run Time** (Smart RF) statistical history to assess adjustments made to device configurations to compensate for detected coverage holes or device failures. When invoked by an administrator, Smart RF instructs access point radios to change to a specific channel and begin beaconing using the maximum available transmit power. Within a well-planned deployment, any RF Domain member access point radio should be reachable by at least one other radio. Smart RF records signals received from its neighbors as well as signals from external, un-managed radios. AP-to-AP distance is recorded in terms of signal attenuation. The information from external radios is used during channel assignment to minimize interference.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

- `show smart-rf` [ap|channel-distribution|history|history-timeline|interfering-ap|interfering-neighbors|radio]
- `show smart-rf ap` {%MAC|<DEVICE-NAME>|activity|energy|neighbors|on <DOMAIN-NAME>}
- `show smart-rf ap` {%MAC|<DEVICE-NAME>}{on <DOMAIN-NAME>}
- `show smart-rf ap` {activity|energy|neighbors} {%MAC|<DEVICE-NAME>}{(on <DOMAIN-NAME>)}
- `show smart-rf channel-distribution` [history|history-timeline]{on <DOMAIN-NAME>}
- `show smart-rf radio` {%MAC|activity|all-11an|all-11bgn|channel|energy|neighbors|on <DOMAIN-NAME>}
- `show smart-rf radio` {%MAC|all-11an|all-11bgn|energy <MAC>}{on <DOMAIN-NAME>}
- `show smart-rf radio` {activity|neighbors} {%MAC|all-11an|all-11bgn}{on <DOMAIN-NAME>}
- `show smart-rf interfering-ap` {%MAC|<DEVICE-NAME>}{on <DOMAIN-NAME>}
- `show smart-rf interfering-neighbors` {%MAC|<DEVICE-NAME>}{on <DOMAIN-NAME}{threshold <50-100>}

### Parameters

- **show smart-rf ap** {%MAC|<DEVICE-NAME>}{on <DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>smart-rf</th>
<th>Displays Smart RF related information</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap</td>
<td>Displays access point related Smart RF information</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Optional. Uses MAC addresses to identify access points. Displays all access points, if no MAC address is specified.</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
<td>Optional. Uses an administrator defined name to identify an access point</td>
</tr>
<tr>
<td>on &lt;DOMAIN-NAME&gt;</td>
<td>Optional. Displays access point details on a specified RF Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DOMAIN-NAME&gt; – Specify the domain name.</td>
</tr>
</tbody>
</table>

- **show smart-rf ap** {activity|energy|neighbors} {%MAC|<DEVICE-NAME>}{(on <DOMAIN-NAME>)}

<table>
<thead>
<tr>
<th>smart-rf</th>
<th>Displays Smart RF related information</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap</td>
<td>Displays AP related Smart RF information</td>
</tr>
</tbody>
</table>
### SHOW COMMANDS 6-133

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>activity</td>
<td>Optional. Displays Smart RF activity related information. Use this option to view the following:</td>
</tr>
<tr>
<td></td>
<td>• Time-period – Lists the frequency Smart RF activity is trended for the RF Domain.</td>
</tr>
<tr>
<td></td>
<td>Trending periods include the current hour, last 24 hours, or the last seven days.</td>
</tr>
<tr>
<td></td>
<td>Comparing Smart RF adjustments versus the last seven days enables an administrator to assess</td>
</tr>
<tr>
<td></td>
<td>whether periods of interference and poor performance were relegated to just specific periods.</td>
</tr>
<tr>
<td></td>
<td>• Power changes – Displays the number of Smart RF initiated power level changes needed for RF</td>
</tr>
<tr>
<td></td>
<td>Domain member devices during each of the three trending periods. Determine whether power</td>
</tr>
<tr>
<td></td>
<td>compensations were relegated to known device outages or if compensations were consistent</td>
</tr>
<tr>
<td></td>
<td>over the course of a day or week.</td>
</tr>
<tr>
<td></td>
<td>• Channel changes – Lists the number of Smart RF initiated channel changes needed for RF Domain</td>
</tr>
<tr>
<td></td>
<td>member devices during each of the three trending periods. Determine if channel adjustments</td>
</tr>
<tr>
<td></td>
<td>were relegated to known device count increases or decreases over the course of a day or week.</td>
</tr>
<tr>
<td></td>
<td>• Coverage changes – Displays the number of Smart RF initiated coverage changes needed for RF</td>
</tr>
<tr>
<td></td>
<td>Domain member devices during each of the three trending periods. Determine if coverage</td>
</tr>
<tr>
<td></td>
<td>changes were relegated to known device failures or known periods of interference over the</td>
</tr>
<tr>
<td></td>
<td>course of a day or week.</td>
</tr>
<tr>
<td>energy</td>
<td>Optional. Displays AP energy for a specified AP or all APs. Use this option to view an RF Domain</td>
</tr>
<tr>
<td></td>
<td>member access point's operating channels, noise level and neighbor count. This information</td>
</tr>
<tr>
<td></td>
<td>helps assess whether Smart RF neighbor recovery is needed in respect to poorly performing</td>
</tr>
<tr>
<td></td>
<td>access points.</td>
</tr>
<tr>
<td>neighbors</td>
<td>Optional. Displays AP neighbors. Use this option to view attributes of neighbor radio resources</td>
</tr>
<tr>
<td></td>
<td>available for Smart RF radio compensations for other RF Domain member device radios.</td>
</tr>
<tr>
<td>smart-rf</td>
<td>Displays Smart RF related information.</td>
</tr>
<tr>
<td>channel-distribution</td>
<td>Displays Smart RF channel distribution information. This provides an overview of how RF Domain</td>
</tr>
<tr>
<td>history</td>
<td>member devices are utilizing different channels to optimally support connect devices and avoid</td>
</tr>
<tr>
<td></td>
<td>congestion and interference with neighboring devices. Assess whether the channel spectrum is</td>
</tr>
<tr>
<td></td>
<td>being effectively utilized and whether channel changes are warranted to improve RF Domain</td>
</tr>
<tr>
<td></td>
<td>member device performance.</td>
</tr>
<tr>
<td>history-timeline</td>
<td>Displays Smart RF calibration history. Use this option to view description and types of Smart</td>
</tr>
<tr>
<td></td>
<td>RF events impacting RF Domain member devices.</td>
</tr>
<tr>
<td>on &lt;DOMAIN-NAME&gt;</td>
<td>Optional. Displays access point details on a specified RF Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DOMAIN-NAME&gt; – Specify the domain name.</td>
</tr>
</tbody>
</table>

* show smart-rf [channel-distribution|history|history-timeline] {on <DOMAIN-NAME>}
### smart-rf radio

- **history-timeline**: Displays extended Smart RF calibration history on an hourly or daily timeline. Use this option to view the time stamp when Smart RF status was updated on behalf of a Smart RF adjustment within the selected RF Domain.

- **on <DOMAIN-NAME>**: The following keyword is common to all of the above parameters:
  - **on <DOMAIN-NAME>** – Optional. Displays Smart RF configuration, based on the parameters passed, on a specified RF Domain.
  - **on <DOMAIN-NAME>** – Specify the RF Domain name.

#### smart-rf
- Displays Smart RF related information

#### radio
- Displays radio related commands

- **<MAC>**: Optional. Displays details of a specified radio. Specify the radio’s MAC address in the AA-BB-CC-DD-EE-FF format.

- **all-11an**: Optional. Displays all 11a radios currently in the configuration

- **all-11bgn**: Optional. Displays all 11bg radios currently in the configuration

#### energy <MAC>
- Optional. Displays radio energy
  - **<MAC>** – Optional. Specify the radio’s MAC address in the AA-BB-CC-DD-EE-FF format.
  - Use this option to view an RF Domain member access point radio’s operating channel, noise level and neighbor count. This information helps assess whether Smart RF neighbor recovery is needed in respect to poorly performing radios.

- **on <DOMAIN-NAME>**: The following keyword is common to all of the above parameters:
  - **on <DOMAIN-NAME>** – Optional. Displays radio details on a specified RF Domain.
  - **<DOMAIN-NAME>** – Specify the RF Domain name.

#### show smart-rf radio {<MAC>|all-11an|all-11bgn|energy <MAC>} {on <DOMAIN-NAME>}

#### activity
- Optional. Displays changes related to radio power, number of radio channels, or coverage holes. Use additional filters to view specific details.

- **<MAC>**: Optional. Displays radio activity for a specified radio
  - **<MAC>** – Specify the radio’s MAC address.

- **all-11an**: Optional. Displays radio activity of all 11a radios in the configuration

- **all-11bgn**: Optional. Displays radio activity of all 11bg radios in the configuration

- **on <DOMAIN-NAME>**: Optional. Displays radio activity of all radios within a specified RF Domain
  - **<DOMAIN-NAME>** – Specify the RF Domain name.

- **show smart-rf radio {activity|neighbors} {<MAC>|all-11an|all-11bgn} {on <DOMAIN-NAME>}

#### interfering-ap
- Displays interfering access points (requiring potential isolation) information
### show smart-rf interfering-neighbors

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;MAC&gt;</code></td>
<td>Optional. Displays information of a specified interfering access point</td>
</tr>
<tr>
<td><code>&lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Displays interfering access point information on a specified device</td>
</tr>
<tr>
<td><code>on &lt;DOMAIN-NAME&gt;</code></td>
<td>Optional. Displays all interfering access point information within a specified RF Domain</td>
</tr>
</tbody>
</table>

**Note:** Considers all APs if this parameter is omitted.

- **show smart-rf interfering-neighbors `<MAC>`|`<DEVICE-NAME>`|`on <DOMAIN-NAME>`|`threshold <50-100>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>smart-rf</code></td>
<td>Displays Smart RF related information</td>
</tr>
<tr>
<td><code>interfering-ap</code></td>
<td>Displays interfering neighboring access point information</td>
</tr>
<tr>
<td><code>&lt;MAC&gt;</code></td>
<td>Optional. Displays interfering neighboring access point information</td>
</tr>
<tr>
<td><code>&lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Displays all interfering neighboring access point information on a specified device</td>
</tr>
</tbody>
</table>

**Note:** Considers all APs if this parameter is omitted.

- **threshold `<50-100>`**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>on &lt;DOMAIN-NAME&gt;</code></td>
<td>Optional. Displays radio activity of all radios within a specified RF Domain</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config)#show smart-rf calibration-status
No calibration currently in progress
rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show smart-rf history
===============================================================================================
<table>
<thead>
<tr>
<th>TIME</th>
<th>EVENT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
===============================================================================================
Total number of history entries displayed: 0
rfs7000-37FABE(config)#
```
### 6.1.64 spanning-tree

#### show commands

Displays spanning tree utilization information

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
show spanning-tree mst {configuration|detail|instance|on <DEVICE-NAME>}
show spanning-tree mst {configuration} {(on <DEVICE-NAME>)}
show spanning-tree mst {detail} {interface|on}
show spanning-tree mst {detail} interface {<INTERFACE-NAME>|ge <1-4>|me1|port-channel <1-2>|pppoe1|vlan <1-4094>|wwan1} {(on <DEVICE-NAME>)}
show spanning-tree mst {instance <1-15>} {interface <INTERFACE-NAME>} {(on <DEVICE-NAME>)}
```

#### Parameters

- **show spanning-tree mst {configuration} {(on <DEVICE-NAME>)}**

<table>
<thead>
<tr>
<th>spanning-tree</th>
<th>Displays spanning tree utilization information</th>
</tr>
</thead>
<tbody>
<tr>
<td>mst</td>
<td>Displays Multiple Spanning Tree (MST) related information</td>
</tr>
<tr>
<td>configuration</td>
<td>Optional. Displays MST configuration</td>
</tr>
<tr>
<td>{on &lt;DEVICE-NAME&gt;}</td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays MST configuration on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP or wireless controller.</td>
</tr>
<tr>
<td>Note:</td>
<td>If the ‘on’ keyword is used without any of the other options, the system displays a summary of spanning tree utilization information on the specified device.</td>
</tr>
</tbody>
</table>

- **show spanning-tree mst {detail} interface {<INTERFACE-NAME>|ge <1-4>|me1|port-channel <1-2>|pppoe1|vlan <1-4094>|wwan1} {(on <DEVICE-NAME>)}**

<table>
<thead>
<tr>
<th>spanning-tree</th>
<th>Displays spanning tree information</th>
</tr>
</thead>
<tbody>
<tr>
<td>mst</td>
<td>Displays MST configuration</td>
</tr>
<tr>
<td>detail</td>
<td>Optional. Displays detailed MST configuration, based on the parameters passed</td>
</tr>
<tr>
<td>interface</td>
<td>Displays detailed MST configuration for a specified interface</td>
</tr>
<tr>
<td>[&lt;INTERFACE&gt;</td>
<td>ge &lt;1-4&gt;</td>
</tr>
<tr>
<td></td>
<td>• ge &lt;1-4&gt; – Displays GigabitEthernet interface MST configuration</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4&gt; – Select the GigabitEthernet interface index from 1 - 4.</td>
</tr>
<tr>
<td>Note:</td>
<td>The GE interface range for NX45XX and NX65XX service platforms is &lt;1 - 24&gt;</td>
</tr>
<tr>
<td></td>
<td>• me1 – Displays FastEthernet interface MST configuration</td>
</tr>
</tbody>
</table>

Contd..
show spanning-tree mst {instance <1-15>} {interface <INTERFACE-NAME>} 
(on <DEVICE-NAME>)

Examples

rfs7000-37FABE(config)#show spanning-tree mst configuration
%
% MSTP Configuration Information for bridge 1:
%------------------------------------------------------
% Format Id : 0
% Name : My Name
% Revision Level : 0
% Digest : 0xac36177f50283cd4b83821d8ab26de62
%------------------------------------------------------

rfs7000-37FABE(config)#show spanning-tree mst detail interface test
% Bridge up - Spanning Tree Disabled
% CIST Root Path Cost 0 - CIST Root Port 0 - CIST Bridge Priority 32768
% Forward Delay 15 - Hello Time 2 - Max Age 20 - Max hops 20
% 1: CIST Root Id 800000157037fabf
% 1: CIST Reg Root Id 800000157037fabf
% 1: CIST Bridge Id 800000157037fabf
% portfast bpdu-filter disabled
% portfast bpdu-guard disabled
% portfast bpdus-filter errdisable timeout disabled
% portfast errdisable timeout interval 300 sec
% cisco interoperability not configured - Current cisco interoperability off

rfs7000-37FABE(config)#
rfs7000-37FABE(config)#show spanning-tree mst detail
% Bridge up - Spanning Tree Disabled
% CIST Root Path Cost 0 - CIST Root Port 0 - CIST Bridge Priority 32768
% Forward Delay 15 - Hello Time 2 - Max Age 20 - Max hops 20
% 1: CIST Root Id 800000157037fabf
% 1: CIST Reg Root Id 800000157037fabf
% 1: CIST Bridge Id 800000157037fabf
% portfast bpdu-filter disabled
% portfast portfast errdisable timeout disabled
% portfast errdisable timeout interval 300 sec
% cisco interoperability not configured - Current cisco interoperability off
% 1: Port 2004 - Id 87d4 - Role Disabled - State Forwarding
% 1: Designated External Path Cost 0 - Internal Path Cost 0
% 1: Configured Path Cost 11520 - Add type Implicit - ref count 1
% 1: Designated Port Id 0 - CST Priority 128
% 1: ge4: CIST Root 0000000000000000
% 1: ge4: Regional Root 0000000000000000
% 1: ge4: Designated Bridge 0000000000000000
% 1: Message Age 0 - Max Age 0
% 1: CIST Hello Time 0 - Forward Delay 0
% 1: CIST Forward Timer 0 - Msg Age Timer 0 - Hello Timer 0
% 1: Version Multiple Spanning Tree Protocol - Received None - Send MSTP
--More--
rfs7000-37FABE(config)#show spanning-tree mst detail
% Bridge up - Spanning Tree Disabled
% CIST Root Path Cost 0 - CIST Root Port 0 - CIST Bridge Priority 32768
% Forward Delay 15 - Hello Time 2 - Max Age 20 - Max hops 20
% 1: CIST Root Id 800000157037fabf
% 1: CIST Reg Root Id 800000157037fabf
% 1: CIST Bridge Id 800000157037fabf
% portfast portfast errdisable timeout disabled
% portfast errdisable timeout interval 300 sec
% cisco interoperability not configured - Current cisco interoperability off
% --More--
rfs7000-37FABE(config)#
6.1.65 startup-config

Displays complete startup configuration script

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show startup-config {include-factory}

Parameters

- show startup-config {include-factory}

<table>
<thead>
<tr>
<th>startup-config</th>
<th>include-factory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays startup configuration script</td>
<td>include-factory — Optional. Includes factory defaults</td>
</tr>
</tbody>
</table>

Examples

nx9500-6C8809#show startup-config
!
! Configuration of NX9500 version 5.8.4.0-008D
!
! version 2.5
!
! client-identity-group default
! load default-fingerprints
!
ip access-list BROADCAST-MULTICAST-CONTROL
! permit tcp any any rule-precedence 10 rule-description "permit all TCP traffic"
ip access-list BROADCAST-MULTICAST-CONTROL
! permit udp any eq 67 any eq dhcp rule-precedence 11 rule-description "permit DHCP replies"
ip access-list BROADCAST-MULTICAST-CONTROL
! deny udp any range 137 138 any range 137 138 rule-precedence 20 rule-description "deny windows netbios"
ip access-list BROADCAST-MULTICAST-CONTROL
! deny ip any 224.0.0.0/4 rule-precedence 21 rule-description "deny IP multicast"
ip access-list BROADCAST-MULTICAST-CONTROL
! deny any host 255.255.255.255 rule-precedence 22 rule-description "deny IP local broadcast"
ip access-list BROADCAST-MULTICAST-CONTROL
! permit ip any any rule-precedence 100 rule-description "permit all IP traffic"
!
mac access-list PERMIT-ARP-AND-IPv4
! permit any any type ip rule-precedence 10 rule-description "permit all IPv4 traffic"
--More--
x9500-6C8809#
### 6.1.66 t5

**show commands**

Displays adopted T5 controller statistics

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX9000, NX9500, NX9510, NX9600

**Syntax**

- `show t5 [boot|clock|cpe|interface|mac|system|temperature|uptime|version|wireless] {on <T5-DEVICE-NAME>}`
- `show t5 [boot|clock|system|temperature|uptime|version] {on <T5-DEVICE-NAME>}`
- `show t5 cpe [address|boot|ether port status|led|reset|system|uptime|version] {on <T5-DEVICE-NAME>}`
- `show t5 interface [dsl|fe|ge|radio] {on <T5-DEVICE-NAME>}`
- `show t5 interface [dsl|fe|ge] [counter|description|errors|status|utilization] {on <T5-DEVICE-NAME>}`
- `show t5 interface dsl custom [avg|dse|dsses|peak|uses|usses] {on <T5-DEVICE-NAME>}`
- `show t5 interface radio [stats|status|wlam-map] {on <T5-DEVICE-NAME>}`
- `show t5 mac table [filter name [dsl<1-24]|ge <1-2]|vlan <1-4094]|wlan <1-24]] {on <T5-DEVICE-NAME>}`
- `show t5 wireless [client|wlan] {on <T5-DEVICE-NAME>}`
- `show t5 wireless client {filter name [association-status|authentication-status|bss|mac-address|retry-percentage|rssi-value]} {on <T5-DEVICE-NAME>}`
- `show t5 wireless wlan counters [qos|rate|size] {on <T5-DEVICE-NAME>}`

**Parameters**

- `show t5 [boot|clock|system|temperature|uptime|version] {on <T5-DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>t5</td>
<td>Displays adopted T5 controller statistics</td>
</tr>
<tr>
<td>boot</td>
<td>Displays the T5 device's boot details. Use this option to view the primary and secondary image files available to use for booting up.</td>
</tr>
<tr>
<td>clock</td>
<td>Displays the T5 controller's system time, as reported from the controller itself or its remote NTP time resource</td>
</tr>
<tr>
<td>system</td>
<td>Displays T5 controller's system information, which includes the T5 controller's hostname, MAC address, RF Domain, system clock, uptime</td>
</tr>
<tr>
<td>temperature</td>
<td>Displays T5 controller’s current temperature</td>
</tr>
<tr>
<td>uptime</td>
<td>Displays the T5 controller's uptime (the time it has been actively deployed and operational)</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>`show t5 cpe [address</td>
<td>boot</td>
</tr>
</tbody>
</table>
| `show t5 interface [dsl|fe|ge] [counter|description|errors|status|utilization] {on <T5-DEVICE-NAME>}` | Displays T5 interface-related statistics based on the interface selected. Select the interface type. The options are: dsl, fe, ge. 
  * dsl – Displays Digital Subscriber Line (DSL) interface related information
  * fe – Displays Fast Ethernet (FE) interface related information
  * ge – Displays Gigabit Ethernet (GE) interface related information

The system displays the following information for the DSL, GE, and FE ports:
  * counter – Displays the following:
    * Number of octets (bytes) received and transmitted on this port
    * Number of data packets received and transmitted on this port
    * Number of flow control (layer 2) packets received and transmitted on this port

Contd..
---

<table>
<thead>
<tr>
<th>contd..</th>
<th>• description – Displays the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• The selected port's name</td>
</tr>
<tr>
<td></td>
<td>• The numeric index assignable to each port</td>
</tr>
<tr>
<td></td>
<td>• The 64 character maximum, unique, administrator-assigned description to each port</td>
</tr>
<tr>
<td></td>
<td>• errors – Displays the following DSL interface related errors:</td>
</tr>
<tr>
<td></td>
<td>• The name of the DSL utilized by each T5 controller connected CPE device.</td>
</tr>
<tr>
<td></td>
<td>• The number of FECs detected in the downstream direction.</td>
</tr>
<tr>
<td></td>
<td>Forward Error Correction (FEC) or channel coding is used for controlling errors over unreliable or noisy communication channels.</td>
</tr>
<tr>
<td></td>
<td>• The number of CPE DSL coding violations (badly coded packets) detected in the downstream direction.</td>
</tr>
<tr>
<td></td>
<td>• The number of FECs detected in the upstream direction.</td>
</tr>
<tr>
<td></td>
<td>• The number of CPE DSL coding violations (badly coded packets) detected in the upstream direction.</td>
</tr>
<tr>
<td></td>
<td>• status – Displays the following:</td>
</tr>
<tr>
<td></td>
<td>• The selected port's name</td>
</tr>
<tr>
<td></td>
<td>• Whether the port is currently up or down as a T5 controller transmit and receive resource</td>
</tr>
<tr>
<td></td>
<td>• The port's current speed in MB</td>
</tr>
<tr>
<td></td>
<td>• Whether pause packet utilization is currently off or on for the selected port</td>
</tr>
<tr>
<td></td>
<td>• Whether each listed port is enabled or disabled by the administrator</td>
</tr>
<tr>
<td></td>
<td>• utilization – Displays the following:</td>
</tr>
<tr>
<td></td>
<td>• The selected port's name</td>
</tr>
<tr>
<td></td>
<td>• The port's receive and transmit data rates (in Kbps)</td>
</tr>
<tr>
<td></td>
<td>• The packet per second port receive and transmit rates (p/s)</td>
</tr>
<tr>
<td></td>
<td>• Each port's receive and transmit direction utilization as a percentage of the total transmit bandwidth available.</td>
</tr>
<tr>
<td>on &lt;T5-DEVICE-NAME&gt;</td>
<td>Optional. Executes the command on a specified T5 device</td>
</tr>
<tr>
<td></td>
<td>• &lt;T5-DEVICE-NAME&gt; – Specify the T5 device's hostname. An error message is displayed if no T5 device name is specified.</td>
</tr>
</tbody>
</table>

<p>| t5 | Displays adopted T5 controller statistics |
| interface | Displays T5 interface-related statistics based on the interface selected |
| dsl | Selects A T5 controller’s DSL interface. |
| | A T5 controller uses the operating system to manage its connected radio devices, as opposed to the WiNG operating used by RFS controllers and NX service platforms. |
| | However, a T5 controller, once enabled as a supported external device, can provide data to WiNG to assist in a T5's management within a WiNG supported subnet populated by both types of devices. The CPEs are the T5 controller managed radio devices using the operating system. These CPEs use a DSL as their high speed Internet access mechanism using the CPE’s physical wallplate connection and phone jack. |</p>
<table>
<thead>
<tr>
<th>command</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>custom</td>
<td>Displays following custom CPE DSL data:</td>
</tr>
<tr>
<td>[avg</td>
<td>dses</td>
</tr>
<tr>
<td></td>
<td>• dses – The number of seconds downstream DSL transmissions were negatively impacted by code violations.</td>
</tr>
<tr>
<td></td>
<td>• dsses – The number of seconds downstream DSL transmissions were severely negatively impacted by code violations.</td>
</tr>
<tr>
<td></td>
<td>• peak – Each DSL’s maximum (best to date since the screen was refreshed) response time in microseconds.</td>
</tr>
<tr>
<td></td>
<td>• uses – The number of seconds upstream DSL transmissions were negatively impacted by code violations.</td>
</tr>
<tr>
<td></td>
<td>• usses – The number of seconds upstream DSL transmissions were severely negatively impacted by code violations.</td>
</tr>
<tr>
<td>on &lt;T5-DEVICE-NAME&gt;</td>
<td>Optional. Executes the command on a specified T5 device</td>
</tr>
<tr>
<td></td>
<td>• &lt;T5-DEVICE-NAME&gt; – Specify the T5 device’s hostname. An error message is displayed if no T5 device name is specified.</td>
</tr>
<tr>
<td>t5</td>
<td>Displays adopted T5 controller statistics</td>
</tr>
<tr>
<td>interface</td>
<td>Displays T5 interface-related statistics based on the interface selected</td>
</tr>
<tr>
<td>radio</td>
<td>Displays following radio interface related information:</td>
</tr>
<tr>
<td>[stats</td>
<td>status</td>
</tr>
</tbody>
</table>
### show t5 mac table

- **filter name [dsl <1-24> | ge <1-2> | vlan <1-4094> | wlan <1-24>]**
  - Displays T5 MAC address table. The T5 MAC table displays a dynamic list of MAC addresses learned by the T5 controller over its ethernet interfaces. Use this information to identify devices and the interfaces on which they can be found.
  - Use the following additional filters to filter on the basis of the VLAN or DSL interface:
    - `dsl <1-24>` – Filters information on the basis of the selected DSL port
    - `ge <1-2>` – Filters information on the basis of the selected GE port
    - `vlan <1-4094>` – Filters information on the basis of the selected VLAN port
    - `wlan <1-24>` – Filters on the basis of the selected CPE

### show t5 wireless client

- **filter name [association-status | authentication-status | bss | mac-address | retry-percentage | rssi-value]**
  - Displays the T5 wireless client and WLAN related statistics
  - Use the additional filters available to view specific client-related information. The options are:
    - `association-status`
    - `authentication-status`
    - `bss`
    - `retry-percentage`
    - `rssi-value`
on <T5-DEVICE-NAME> | Optional. Executes the command on a specified T5 device
• <T5-DEVICE-NAME> – Specify the T5 device’s hostname. An error message is displayed if no T5 device name is specified.

• show t5 wireless wlan counters [qos|rate|size] {on <T5-DEVICE-NAME>}

| t5 | Displays adopted T5 controller statistics |
| wireless wlan [qos|rate|size] | Displays the T5 wireless WLAN related statistics |
| • wlan – Displays following T5 controller traffic counter statistics: |
| • qos – T5 controller WLAN QoS utilization. Displays the number of background (low priority) and best-effort packets received and transmitted on each listed T5 controller managed WLANs |
| • rates – Displays T5 controller’s WLAN utilization data rate statistics |
| • lists the number of data packets received and transmitted in the WLAN that have been relegated to a 1 Mbps data rate |
| • Lists the number of data packets received and transmitted in the WLAN by T5 controller connected devices at 54Mbps |
| • size – Displays the number of data packets received and transmitted, in each listed WLAN, greater than 1024 bytes |

Examples
The following examples are for show commands executed on the ‘t5-ED7C6C’ controller adopted by the ‘nx9500-6C8809’ wireless controller:

nx9500-6C8809(config)#show t5 boot on t5-ED7C6C
Primary Version: 5.4.2.0-010R
Secondary Version: 5.4.2.0-006B
Next Boot: Primary
Upgrade Status: none
Upgrade Progress %: 0
nx9500-6C8809(config)#

nx9500-6C8809(config)#show t5 version on t5-ED7C6C
Bootloader Version: 5.4.2.0-010R
Application Version: 5.4.2.0-010R
nx9500-6C8809(config)#

nx9500-6C8809(config)#show t5 system on t5-ED7C6C
Serial Number 14213522400004
SKU TS-0524-WR
Hardware Rev 5
Mac Address B4-C7-99-ED-7C-6C
Description 24-port PowerBroadband VDSL2 Switch Version 5.4.2.0-010R
Contact NULL
Name t5-ED7C6C
Location NULL
nx9500-6C8809(config)#

nx9500-6C8809(config)#show t5 clock on t5-ED7C6C
Time 19-5-2016 20:26:14 UTC
nx9500-6C8809(config)#
nx9500-6C8809(config)#show t5 interface ge counter on t5-ED7C6C

<table>
<thead>
<tr>
<th>INTERFACE</th>
<th>RECEIVE OCTETS</th>
<th>RECEIVE PACKETS</th>
<th>RECEIVE PAUSE PKTS</th>
<th>TRANSMIT OCTETS</th>
<th>TRANSMIT PACKETS</th>
<th>TRANSMIT PAUSE PKTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge1</td>
<td>711128918</td>
<td>89636040</td>
<td>0</td>
<td>2558110037</td>
<td>133720283</td>
<td>0</td>
</tr>
<tr>
<td>ge2</td>
<td>2515775064</td>
<td>133311355</td>
<td>0</td>
<td>3422167586</td>
<td>78735853</td>
<td>0</td>
</tr>
</tbody>
</table>

nx9500-6C8809(config)#

nx9500-6C8809(config)#show t5 uptime on t5-ED7C6C
Up Time 0 days 1 day, 3:19:43

nx9500-6C8809(config)#

nx9500-6C8809(config)#show t5 temperature on t5-ED7C6C

<table>
<thead>
<tr>
<th>INDEX</th>
<th>CURRENT (C)</th>
<th>FANS @ FULL SPEED (C)</th>
<th>FANS @ VARIABLE SPEED (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>39</td>
<td>70</td>
<td>60</td>
</tr>
</tbody>
</table>

nx9500-6C8809(config)#

nx9500-6C8809(config)#show t5 cpe address on t5-ED7C6C

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>STATUS</th>
<th>IP ADDRESS</th>
<th>MAC ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpe1</td>
<td>ready</td>
<td>192.168.13.32</td>
<td>00-C0-23-69-80-CD</td>
</tr>
<tr>
<td>cpe2</td>
<td>ready</td>
<td>192.168.13.33</td>
<td>74-F7-40-16-62</td>
</tr>
<tr>
<td>cpe3</td>
<td>disconnected</td>
<td>0.0.0.0</td>
<td>00-00-00-00-00-00</td>
</tr>
<tr>
<td>cpe4</td>
<td>disconnected</td>
<td>0.0.0.0</td>
<td>00-00-00-00-00-00</td>
</tr>
<tr>
<td>cpe5</td>
<td>disconnected</td>
<td>0.0.0.0</td>
<td>00-00-00-00-00-00</td>
</tr>
</tbody>
</table>

--More--

nx9500-6C8809(config)#

nx9500-6C8809(config)#show t5 cpe led on t5-ED7C6C

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>LED STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpe1</td>
<td>enable</td>
</tr>
<tr>
<td>cpe2</td>
<td>enable</td>
</tr>
<tr>
<td>cpe3</td>
<td>enable</td>
</tr>
<tr>
<td>cpe4</td>
<td>enable</td>
</tr>
<tr>
<td>cpe5</td>
<td>enable</td>
</tr>
</tbody>
</table>

--More--

nx9500-6C8809(config)#

nx9500-6C8809(config)#show t5 mac table filter name vlan 1 on t5-ED7C6C

<table>
<thead>
<tr>
<th>T5-MAC</th>
<th>VLAN</th>
<th>ADDRESS</th>
<th>INTERFACE</th>
<th>VENDOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4-C7-99-ED-7C-6C</td>
<td>1</td>
<td>00-02-B3-28-D1-55</td>
<td>ge1</td>
<td>Intel Corp</td>
</tr>
<tr>
<td>B4-C7-99-ED-7C-6C</td>
<td>1</td>
<td>00-1E-67-4B-BF-BD</td>
<td>ge1</td>
<td>Intel Corp</td>
</tr>
<tr>
<td>B4-C7-99-ED-7C-6C</td>
<td>1</td>
<td>00-23-68-11-E6-C4</td>
<td>ge1</td>
<td>Zebra Tech</td>
</tr>
<tr>
<td>B4-C7-99-ED-7C-6C</td>
<td>1</td>
<td>00-23-68-88-0D-A7</td>
<td>ge1</td>
<td>Zebra Tech</td>
</tr>
<tr>
<td>B4-C7-99-ED-7C-6C</td>
<td>1</td>
<td>00-23-68-99-BB-7C</td>
<td>ge1</td>
<td>Zebra Tech</td>
</tr>
<tr>
<td>B4-C7-99-ED-7C-6C</td>
<td>1</td>
<td>00-A0-F8-68-D5-70</td>
<td>ge1</td>
<td>Zebra Tech</td>
</tr>
<tr>
<td>B4-C7-99-ED-7C-6C</td>
<td>1</td>
<td>00-C0-23-69-80-CD</td>
<td>dsl1</td>
<td>00-C0-23</td>
</tr>
<tr>
<td>B4-C7-99-ED-7C-6C</td>
<td>1</td>
<td>1C-7E-E5-18-FA-67</td>
<td>ge1</td>
<td>D-Link Corp</td>
</tr>
<tr>
<td>B4-C7-99-ED-7C-6C</td>
<td>1</td>
<td>3C-CE-73-F4-47-83</td>
<td>ge1</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>B4-C7-99-ED-7C-6C</td>
<td>1</td>
<td>74-F7-40-16-62</td>
<td>dsl2</td>
<td>Wistrion Corp</td>
</tr>
</tbody>
</table>

--More--

nx9500-6C8809(config)#
6.1.67 terminal

*show commands*

Displays terminal configuration parameters

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7622, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

show terminal

**Parameters**

None

**Examples**

rfs7000-37FABE(config)#show terminal
Terminal Type: xterm
Length: 24 Width: 200
rfs7000-37FABE(config)#
6.1.68  timezone

Displays a device's timezone

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`show timezone`

Parameters

None

Examples

```
rfs7000-37FABE(config)#show timezone
Timezone is America/Los_Angeles
rfs7000-37FABE(config)#
```
6.1.69 traffic-shape

Displays traffic-shaping related configuration details and statistics

Traffic shaping regulates network data transfers to ensure a specific performance level. Traffic shaping delays the flow of packets defined as less important than prioritized traffic streams. Traffic shaping enables traffic control out an interface to match its flow to the speed of a remote target’s interface and ensure traffic conforms applied policies. Traffic can be shaped to meet downstream requirements and eliminate network congestion when data rates are in conflict.

Apply traffic shaping to specific applications to apply application categories. When application and ACL rules are conflicting, ACL rules take precedence for the traffic shaping class. Using traffic shaping, an application takes precedence over an application category.

Supported in the following platforms:
- Access Points — AP622, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530

Syntax
```
show traffic-shape [priority-map|statistics {class <1-4>}|status] {on <DEVICE-NAME>}
```

Parameters
- `show traffic-shape [priority-map|statistics {class <1-4>}|status] {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>traffic-shape</th>
<th>Displays traffic-shaping related configuration details and statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>priority-map</td>
<td>Displays the traffic shaper queue priority. There are 8 queues (0 - 7), and traffic is queued in each based on incoming packets 802.1p markings.</td>
</tr>
<tr>
<td>statistics class &lt;1-4&gt;</td>
<td>Displays traffic-shaping related statistics for all traffic shaper classes or for a selected class</td>
</tr>
</tbody>
</table>
  - class <1-4> – Optional. Specify the traffic class from 1 - 4. The system displays traffic shaping statistics for the selected class. If not selected, the system statistics for all classes. |
| status        | Displays the controller or service platform’s traffic shaping status (whether running or not) |
| on <DEVICE-NAME> | Optional. Displays traffic-shaping related configuration details and statistics on a specified device |
  - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |

Examples
```
ap7532-DEB9B0#show traffic-shape priority-map
-----------------------------
DOT1P-PRIORITY    TX-SHAPER-PRIORITY
-----------------------------
0                2
1                0
2                1
3                3
4                4
5                5
6                6
7                7
-----------------------------
ap7532-DEB9B0#
```
ap7532-DEB9B0# show traffic-shape status
State of Traffic shaper: running
ap7532-DEB9B0#

ap7532-DEB9B0# show traffic-shape statistics

Traffic shaper class : 1
Class 1 is not configured:

Traffic shaper class : 3
Class 3 is not configured:

Traffic shaper class : 2
Rate: 1500 Kbps

<table>
<thead>
<tr>
<th>PRIORITY</th>
<th>PKTS-SENT</th>
<th>PKTS-DELAYED</th>
<th>PKTS-DROPPED</th>
<th>CURRENT-QUEUE-LEN</th>
<th>CURRENT-LATENCY (IN USECS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>152153035</td>
<td>151924251</td>
<td>1508343</td>
<td>11</td>
<td>33447</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Traffic shaper class : 4
Class 4 is not configured:
ap7532-DEB9B0#
6.1.70 upgrade-status

Displays the last image upgrade status

NOTE: This command is not available in the USER EXEC Mode.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
show upgrade-status
show upgrade-status {detail|on}
show upgrade-status {detail} {(on <DEVICE-NAME>)}

Parameters
- show upgrade-status {detail|on}
- show upgrade-status {detail} {(on <DEVICE-NAME>)}

Examples
rfs4000-229D58# show upgrade-status
Last Image Upgrade Status : In_Progress(3 percent completed)
Last Image Upgrade Time : 2016-04-29 16:39:31
rfs4000-229D58#

rfs4000-229D58# show upgrade-status
Last Image Upgrade Status : Successful
Last Image Upgrade Time : 2016-04-29 16:39:52
rfs4000-229D58#

rfs4000-229D58(config)# show upgrade-status detail
Last Image Upgrade Status : Successful
Last Image Upgrade Time : 2016-04-29 16:39:52
-----------------------------------------------
Running from partition /dev/mtdblock7
var2 is 3 percent full
/tmp is 3 percent full
Free Memory 96504 kB
FWU invoked via Linux shell
Validating image file header
Making file system
Extracting files (this may take some time).
Control C disabled
Version of firmware update file is 5.8.4.0-008D
Writing Kernel to /dev/mtd4
Writing BootOS to /dev/mtd2
Successful

rfs4000-229D58(config)#
6.1.71 **version**

Show commands

Displays a device's software and hardware version

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show version {on <DEVICE-NAME>}
```

**Parameters**

- `show version {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| version {on <DEVICE-NAME>} | Displays software and hardware versions on all devices or a specified device
| on <DEVICE-NAME> | Optional. Displays software and hardware versions on a specified device
| <DEVICE-NAME> | Specify the name of the AP, wireless controller, or service platform.

**Examples**

```
rfs4000-229D58(config)#show version
RFS4000 version 5.8.4.0-008D
Copyright (c) 2004-2016 Symbol Technologies, Inc. All rights reserved.
Booted from primary
rfs4000-880DA7 uptime is 0 days, 01 hours 37 minutes
CPU is Cavium Networks Octeon CN50XX V0.1
Base ethernet MAC address is 00-23-68-22-9D-58
System serial number is 9184521800027
Model number is RFS-4010-00010-WR
PoE firmware version is 211 build 1
FPGA version is 2.26
Radio HAL version is 92 (DFS:73)
rfs4000-229D58(config)#
```
### 6.1.72 vrrp

**show commands**

Displays the following Virtual Router Redundancy Protocol (VRRP) related statistics: configuration error, router redundancy information in brief and detail. VRRP configuration errors include mismatch of authentication credentials, invalid packet checksums, invalid packet types, invalid virtual route IDs, TTL errors, packet length errors and invalid (non matching) VRRP versions.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show vrrp [brief|details|error-stats|stats] {<1-255>} {(on <DEVICE-NAME>)}
show vrrp error-stats {on <DEVICE-NAME>}
```

**Parameters**

- **vrrp [brief|details|stats] {<1-255>} {(on <DEVICE-NAME>)}**
  - **brief** Displays VRRP related statistics in brief or in detail depending on the option selected
  - **details** Displays virtual router information in brief
  - **stats** Displays virtual router information in detail
  - **<1-255>** The following keyword is common to all of the above parameters:
    - **<1-255>** – Optional. Displays information for a specified Virtual Router. Specify the router's ID from 1 -255.
  - **on <DEVICE-NAME>** The following keyword is recursive and common to the ‘<1-255>’ parameter:
    - **on <DEVICE-NAME>** – Optional. Displays specified router information on a specified device
    - **<DEVICE-NAME>** – Specify the name of the AP, wireless controller, or service platform.

- **show vrrp error-stats {on <DEVICE-NAME>**

- **error-stats {on <DEVICE-NAME>**
  - Displays VRRP related statistics in brief or in detail depending on the option selected
  - **error-stats** Displays global error statistics
  - **<DEVICE-NAME>** – Optional. Displays global error statistics on a specified device
  - **<DEVICE-NAME>** – Specify the name of the AP, wireless controller, or service platform.
Examples
rfs7000-37FABE(config)#show vrrp error-stats
Last protocol error reason: none
IP TTL errors: 0
Version mismatch: 0
Packet Length error: 0
Checksum error: 0
Invalid virtual router id: 0
Authentication mismatch: 0
Invalid packet type: 0
rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show vrrp details
VRRP Group 1:
  version 2
  interface none
  configured priority 1
  advertisement interval 1 sec
  preempt enable, preempt-delay 0
  virtual mac address 00-00-5E-00-01-01
  sync group disable
rfs7000-37FABE(config)#
### 6.1.73 web-filter

#### show commands

Displays Web filtering related information

Use this command to view information on Web requests for content and whether the requests were blocked or approved based on URL filter settings defined for the selected controller or service platform. A URL filter is comprised of several filter rules. A whitelist bans all sites except the categories and URL lists defined in the whitelist. The blacklist allows all sites except the categories and URL lists defined in the blacklist.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP7131, AP7502, AP7522, AP7532, AP7562, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

#### Syntax

```
show web-filter [category|category-type|config|filter-level [basic|high|low|medium|medium-high]|statistics {on <DEVICE-NAME>}]|status
```

#### Parameters

- **show web-filter [category|category-type|config|filter-level [basic|high|low|medium|medium-high]|statistics {on <DEVICE-NAME>}]|status**
  - **web-filter** Displays an existing and configured Web filter details
  - **category** Displays Web filter categories. A category is a pre-defined URL list available in the WiNG software.
  - **category-type** Displays the Web filter category types. This is a pre-configured list of categories and sub-categories in which commonly accessed URLs have been classified.
  - **config** Displays all existing Web filters and their configuration details
  - **filter-level [basic|high|low|medium|medium-high]** Displays category types for the selected filter-level. Each filter level is pre-configured to use a set of category types. You cannot change the categories in the category types used for these pre-configured filter-level settings. Nor can you add, modify, or remove the category types mapped to a filter-level setting. The options are:
    - basic – Displays all category types configured for the basic filter-level
    - high – Displays all category types configured for the high filter-level
    - low – Displays all category types configured for the low filter-level
    - medium – Displays all category types configured for the medium filter-level
    - medium-high – Displays all category types configured for the medium-high filter-level
  - **statistics {on <DEVICE-NAME>}** Displays Web filter statistics on a specified device
    - on <DEVICE-NAME> – Optional. Specifies the device name
  - **status {on <DEVICE-NAME>}** Displays Web filter status on a specified device
    - on <DEVICE-NAME> – Optional. Specifies the device name

#### Note:
Web filtering is a licensed feature, and only when enforced can the system display Web filtering statistics.
Examples

nx9500-6C8809(config)#show web-filter category
    advertisement-popsups
        Sites that provide advertising graphics or other ad content files such as banners and pop-ups.
    alcohol-tobacco
        Sites that promote or sell alcohol- or tobacco-related products or services.
    anonymizers
        Sites and proxies that act as an intermediary for surfing to other websites in an anonymous fashion, whether to circumvent web filtering or for other reasons.
    arts
        Sites with artistic content or relating to artistic institutions such as theaters, museums, galleries, dance companies, photography, and digital graphic resources.
    botnets
        Sites that use bots (zombies) including command-and-control sites.
--More--
nx9500-6C8809(config)#

nx9500-6C8809(config)#show web-filter config
URL filters configured for this device are:
    WebFilter_ShoppingSites
        Blacklisted categories:
            shopping,
        Whitelisted categories:
            <AllowedShopping>,
nx9500-6C8809(config)#
6.1.74 what

Show commands

Displays details of a specified search phrase (performs global search)

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show what [contain|is] <WORD> {on <DEVICE-OR-DOMAIN-NAME>}

Parameters

- contain <WORD> Searches on all the items that contain a specified word
  - <WORD> – Specify a word to search (for example, MAC address, hostname, etc.).
- is <WORD> Searches on an exact match
  - <WORD> – Specify a word to search (for example, MAC address, hostname, etc.).
- on <DEVICE-OR-DOMAIN-NAME> Optional. Performs global search on a specified device or RF Domain
  - <DEVICE-OR-DOMAIN-NAME> – Specify the name of the AP, wireless controller, service platform, or RF Domain.

Examples

rfs4000-229D58#show what contain default

---------------------------------------------------------------------------------------
NO. CATEGORY             MATCHED                        OTHER KEY INFO (1)             OTHER KEY INFO (2)             OTHER KEY INFO (3)             OTHER
NAME/VALUE                     NAME/VALUE                     NAME/VALUE                     NAME/VALUE                     NAME/VALUE
---------------------------------------------------------------------------------------
https-trustpoint               type                           mac
rf_domain_name
1   device-cfg           default-trustpoint             rfs4000                        00-23-68-22-9D-58              default
2   firewall_policy      default                        default                        True
2   idle_session_timeout  default                        30                             https
3   management_policy    default                        default                        True
3   qos_policy           control_vlan
--More--
rfs4000-229D58#
### 6.1.75 wireless

**Show Commands**

Displays wireless configuration parameters

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
show wireless [ap|bridge|client|coverage-hole-incidents|meshpoint|mint|mobility-database|radio|regulatory|rf-domain|sensor-server|unsanctioned|wips|wlan]
```

```
show wireless ap {configured|detail|load-balancing|on <DEVICE-NAME>}
show wireless ap {configured}
show wireless ap {detail} {<MAC/HOST-NAME>} {(on <DEVICE-OR-DOMAIN-NAME>)}
show wireless ap {load-balancing} {client-capability|events|neighbors}
{(on <DEVICE-NAME>)}
```

```
show wireless bridge {candidate-ap|certificate|config|hosts|on|statistics}
show wireless bridge {candidate-ap} {<MAC/HOSTNAME> {<1-3>}} {{filter radio-mac <RADIO-MAC>}} {(on <DEVICE-OR-DOMAIN-NAME>)}
show wireless bridge {certificate} status {(on <DEVICE-NAME>)}
show wireless bridge {config}
show wireless bridge {hosts} {on <DEVICE-OR-DOMAIN-NAME>}
show wireless bridge {statistics} {rf|traffic} {(on <DEVICE-OR-DOMAIN-NAME>)}
```

```
show wireless client {association-history|detail|filter|include-ipv6|on <DEVICE-OR-DOMAIN-NAME>|statistics|tspec}
show wireless client {association-history <MAC>} {on <DEVICE-OR-DOMAIN-NAME>}
show wireless client {detail <MAC>} {(on <DEVICE-OR-DOMAIN-NAME>)}
show wireless client {filter [ip|on|state|wlan]}
show wireless client {filter} {ip [<IP>|not <IP>]} {on <DEVICE-OR-DOMAIN-NAME>}
show wireless client {filter} {on <DEVICE-OR-DOMAIN-NAME>}
show wireless client {filter} {state [data-ready|not [data-ready|roaming]|roaming]}
{(on <DEVICE-OR-DOMAIN-NAME>)}
show wireless client {filter} {wlan [<WLAN-NAME>|not <WLAN-NAME>]}{(on <DEVICE-OR-DOMAIN-NAME>)}
```

```
show wireless client {include-ipv6} {detail|on|filter}
show wireless client {include-ipv6} {detail <MAC>} {(on <DEVICE-OR-DOMAIN-NAME>)}
show wireless client {include-ipv6} {filter [ip|ipv6|state|wlan]}
```

```
show wireless client {statistics} {detail|on|rf|window-data}
show wireless client {statistics} {detail <MAC>|rf|window-data <MAC>}
{(on <DEVICE-OR-DOMAIN-NAME>)}
```

```
show wireless client {tspec <MAC>} {(on <DEVICE-OR-DOMAIN-NAME>)}
```

```
show wireless coverage-hole-incidents [detail|on|summary]
show wireless coverage-hole-incidents detail {filter [ap <MAC/HOSTNAME>]
  client-mac <MAC>]} {(on <DOMAIN-NAME)}
```

```
show wireless meshpoint {config|detail|multicast|neighbor|path|proxy|root|security|statistics|tree|usage-mappings}
show wireless meshpoint {config} {filter [device <DEVICE-NAME>]
  rf-domain <DEVICE-NAME>}
show wireless meshpoint {detail} {<MESHPOINT-NAME>}
```
show wireless meshpoint {on DEVICE-OR-DOMAIN-NAME} [MESHPOINT-NAME] {multicast/path/proxy/root/security/statistics} {on DEVICE-OR-DOMAIN-NAME} show wireless meshpoint neighbor [MESHPOINT-NAME] {on DEVICE-OR-DOMAIN-NAME} show wireless meshpoint [tree] {on DEVICE-OR-DOMAIN-NAME} show wireless meshpoint {usage-mappings} show wireless mobility-database {on DEVICE-NAME} show wireless mint [client/detail]links|portal|statistics} {on DEVICE-OR-DOMAIN-NAME} show wireless [client/detail] {on}portal-candidates {DEVICE-OR-DOMAIN-NAME} show wireless mint links {on DEVICE-OR-DOMAIN-NAME} show wireless mint portal statistics {on DEVICE-OR-DOMAIN-NAME} show wireless radio {detail} {on DEVICE-OR-DOMAIN-NAME}statistics} {on DEVICE-OR-DOMAIN-NAME} show wireless radio {filter|on DEVICE-OR-DOMAIN-NAME} show wireless radio {filter|on DEVICE-OR-DOMAIN-NAME} show wireless radio {statistics} {on DEVICE-OR-DOMAIN-NAME} rf {on DEVICE-OR-DOMAIN-NAME} show wireless radio {statistics} {on DEVICE-OR-DOMAIN-NAME} show wireless radio {statistics} {on DEVICE-OR-DOMAIN-NAME}show wireless radio {statistics} {on DEVICE-OR-DOMAIN-NAME} show wireless regulatory [channel-info WORD|country-code WORD] device-type show wireless regulatory device-type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap7131|ap7161|ap7181|ap7502|ap7522|ap7532|ap7562|ap8132|ap8163|ap82xx|ap8432|ap8533|rfs4000] WORD show wireless rf-domain statistics {detail} {on DEVICE-OR-DOMAIN-NAME} show wireless sensor-server {on DEVICE-OR-DOMAIN-NAME} show wireless unsanctioned aps {detail|statistics} {on DEVICE-OR-DOMAIN-NAME} show wireless wips [client-blacklist|event-history} {on DEVICE-OR-DOMAIN-NAME} show wireless wlan {config/detail WLAN|on DEVICE-OR-DOMAIN-NAME}policy-mappings|statistics|usage-mappings} show wireless wlan {detail WLAN|on DEVICE-OR-DOMAIN-NAME}policy-mappings|usage-mappings} show wireless {config filter device DEVICE-NAME|rf-domain DOMAIN-NAME} show wireless wlan statistics {WLAN|detail|traffic} {on DEVICE-OR-DOMAIN-NAME} show wireless wlan statistics {WLAN|detail|traffic} {on DEVICE-OR-DOMAIN-NAME} show wireless wlan statistics {WLAN|detail|traffic} {on DEVICE-OR-DOMAIN-NAME} Parameters
• show wireless ap {configured} show wireless Displays wireless configuration parameters
ap Displays managed access point information
configured Optional. Displays configured AP information, such as name, MAC address, profile, RF Domain, and adoption status
• show wireless ap {detail} {MAC/HOST-NAME} {on DEVICE-OR-DOMAIN-NAME} show wireless Displays wireless configuration parameters
ap Displays managed access point information
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show wireless ap</td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td>ap</td>
<td>Displays managed access point information</td>
</tr>
<tr>
<td>load-balancing</td>
<td>Optional. Displays load balancing status. Use additional filters to view specific details.</td>
</tr>
<tr>
<td>{client-capability}</td>
<td>client-capability – Optional. Displays client band capability</td>
</tr>
<tr>
<td>{events}</td>
<td>events – Optional. Displays client events</td>
</tr>
<tr>
<td>{neighbors}</td>
<td>neighbors – Optional. Displays neighboring clients</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following keyword is recursive and common to the ‘detail &lt;MAC/HOST-NAME&gt;’ parameter:</td>
</tr>
<tr>
<td></td>
<td>on &lt;DEVICE-NAME&gt; – Optional. Displays information on a specified device or RF Domain</td>
</tr>
<tr>
<td></td>
<td>&lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain</td>
</tr>
<tr>
<td>show wireless bridge</td>
<td>Displays wireless configuration statistics</td>
</tr>
<tr>
<td>candidate-ap</td>
<td>Optional. Displays information about the candidate infrastructure access points as well as the</td>
</tr>
<tr>
<td></td>
<td>infrastructure access point that the client-bridge radio has selected</td>
</tr>
<tr>
<td></td>
<td>Note: When enabled, the client-bridge radio scans its defined channels to locate the best candidate</td>
</tr>
<tr>
<td></td>
<td>access point servicing the infrastructure WLAN.</td>
</tr>
<tr>
<td>&lt;MAC/HOSTNAME&gt;</td>
<td>Optional. Specify the client-bridge access point’s hostname or MAC address.</td>
</tr>
<tr>
<td>&lt;1-3&gt;</td>
<td>Optionally append the radio interface’s number to form client-bridge in the form of</td>
</tr>
<tr>
<td></td>
<td>AA-BB-CC-DD-EE-FF:RX or HOSTNAME:RX.</td>
</tr>
<tr>
<td>filter radio-mac</td>
<td>This is a recursive parameter and common to all of the above options.</td>
</tr>
<tr>
<td>&lt;RADIO-MAC&gt;</td>
<td>filter radio-mac – Optional. Provides additional filters to specifically identify the radio by its</td>
</tr>
<tr>
<td></td>
<td>MAC address</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>This is a recursive parameter and common to all of the above options.</td>
</tr>
<tr>
<td></td>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Executes the command on a specified device or devices within</td>
</tr>
<tr>
<td></td>
<td>a specified RF Domain</td>
</tr>
<tr>
<td></td>
<td>&lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the AP, controller, service platform, or RF Domain name.</td>
</tr>
</tbody>
</table>
- **show wireless bridge \{certificate\} status \{on <DEVICE-NAME>\}**

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>bridge certificate status</td>
<td>Optional. Displays all client bridges in configuration and the status of their PKCS#12 certificates</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Executes the command on a specified device</td>
</tr>
<tr>
<td>• &lt;DEVICE-NAME&gt; – Specify the AP, controller, service platform name.</td>
<td></td>
</tr>
</tbody>
</table>

- **show wireless bridge \{config\}**

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>bridge config</td>
<td>Optional. Displays all client bridges in configuration</td>
</tr>
<tr>
<td>The output displays the configured client-bridges’ hostname, MAC address, profile, RF Domain, SSID, band, encryption, authentication, and EAP username.</td>
<td></td>
</tr>
</tbody>
</table>

- **show wireless bridge \{hosts\} \{on <DEVICE-OR-DOMAIN-NAME>\}**

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>bridge hosts</td>
<td>Optional. Displays the client bridge host information</td>
</tr>
<tr>
<td>The output displays the configured client-bridges’ host’s MAC Address, bridge MAC address, IPv4 address, bridging status, and activity</td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> The HOST MAC column displays real MAC addresses of wired hosts, while the BRIDGE MAC column displays the translated MAC addresses. The BRIDGE MAC column is based on the radio 2 base MAC address and increments by 1 for each wired host connected to the client bridges Ge1 port.</td>
<td></td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Executes the command on a specified device or devices within a specified RF Domain</td>
</tr>
<tr>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Specify the AP, controller, service platform, or Domain name.</td>
<td></td>
</tr>
</tbody>
</table>

- **show wireless bridge \{statistics\} \{rf|traffic\} \{on <DEVICE-OR-DOMAIN-NAME>\}**

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>bridge statistics</td>
<td>Optional. Displays the client-bridge related statistics</td>
</tr>
<tr>
<td>rf</td>
<td>Optional. Displays the client-bridge related RF statistics</td>
</tr>
<tr>
<td>The output displays the signal, noise, SNR, TX/RX rates, retries, and errors.</td>
<td></td>
</tr>
<tr>
<td>traffic</td>
<td>Optional. Displays the client-bridge related traffic statistics</td>
</tr>
<tr>
<td>The output displays TX/RX bytes, TX/RX packets, TX/RX bits/second, and dropped packets.</td>
<td></td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Executes the command on a specified device or devices within a specified RF Domain</td>
</tr>
<tr>
<td>• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Specify the AP, controller, service platform, or Domain name.</td>
<td></td>
</tr>
</tbody>
</table>

- **show wireless client \{association-history <MAC>\} \{on <DEVICE-OR-DOMAIN-NAME>\}**

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>client</td>
<td>Displays client information based on the parameters passed</td>
</tr>
<tr>
<td>association-history &lt;MAC&gt;</td>
<td>Optional. Displays association history for a specified client</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Displays association history on a specified device or RF Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

- show wireless client {detail <MAC>} {on <DEVICE-OR-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>client</td>
<td>Displays client information based on the parameters passed</td>
</tr>
<tr>
<td>detail &lt;MAC&gt;</td>
<td>Optional. Displays detailed wireless client(s) information</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>The following keyword is recursive and common to the ‘detail &lt;MAC&gt;’ parameter:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays detailed information on a specified device or RF Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

- show wireless client {filter ip [<IP>|not <IP>]} {on <DEVICE-OR-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>client</td>
<td>Displays client information based on the parameters passed</td>
</tr>
<tr>
<td>filter IP [IP</td>
<td>not &lt;IP&gt;]</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>The following keyword is common to the ‘IP’ and ‘not IP’ parameters:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays selected wireless client information on a specified device or RF Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

- show wireless client {filter} {state [data-ready|not [data-ready|roaming]|roaming]} {on <DEVICE-OR-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>client</td>
<td>Displays client information based on the parameters passed</td>
</tr>
<tr>
<td>filter state [data-ready]</td>
<td>Optional. Filters clients based on their state</td>
</tr>
<tr>
<td>not [data-ready</td>
<td>roaming]</td>
</tr>
<tr>
<td></td>
<td>• Roaming – Selects roaming clients</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>The following keyword is common to the ‘ready’, ‘not’, and ‘roaming’ parameters:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays selected client details on a specified device or RF Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>
### Command: `show wireless client {filter} {wlan [<WLAN-NAME>|not <WLAN-NAME>]} {on <DEVICE-OR-DOMAIN-NAME>}`

- **wireless**: Displays wireless configuration parameters
- **client**: Displays client information based on the parameters passed

| filter wlan [ <WLAN-NAME> | not <WLAN-NAME> ] | Optional. Filters clients on a specified WLAN |
|------------------------|-------------------|
|                       | • <WLAN-NAME> – Specify the WLAN name. |
|                       | • not <WLAN-NAME> – Inverts the match selection |

| on <DEVICE-OR-DOMAIN-NAME> | The following keyword is common to the ‘WLAN and ‘not’ parameters: |
|----------------------------|• on <DEVICE-OR-DOMAIN-NAME> – Optional. Filters clients on a specified device or RF Domain |
|                            |• <DEVICE-OR-DOMAIN-NAME> – Specify the name of the AP, wireless controller, service platform, or RF Domain. |

### Command: `show wireless client {statistics} {detail <MAC>|rf|window-data <MAC>} {on <DEVICE-OR-DOMAIN-NAME>}`

- **wireless**: Displays wireless configuration parameters
- **client**: Displays client information based on the parameters passed

| statistics {detail <MAC>|rf|window-data <MAC>} | Optional. Displays detailed client statistics. Use additional filters to view specific details. |
|--------------------------------------------------|• detail <MAC> – Optional. Displays detailed client statistics |
|                                                  |• <MAC> – Optional. Displays detailed statistics for a specified client. Specify the client’s MAC address. |
|                                                  |• rf – Optional. Displays detailed client statistics on a specified device or RF Domain |
|                                                  |• window-data <MAC> – Optional. Displays historical data, for a specified client |
|                                                  |• <MAC> – Optional. Specify the client’s MAC address |

| on <DEVICE-OR-DOMAIN-NAME> | The following keyword is recursive and common to the ‘detail <MAC>’, ‘RF’, and ‘window-data <MAC>’ parameters: |
|----------------------------|• on <DEVICE-OR-DOMAIN-NAME> – Optional. Displays client statistics, based on the parameters passed, on a specified device or RF Domain |
|                            |• <DEVICE-OR-DOMAIN-NAME> – Specify the name of the AP, wireless controller, service platform, or RF Domain. |

### Command: `show wireless client {tspec} <MAC> {on <DEVICE-OR-DOMAIN-NAME>}`

- **wireless**: Displays wireless configuration parameters
- **client**: Displays client information based on the parameters passed

| tspec <MAC> | Optional. Displays detailed traffic specification (TSPEC) information for all clients or a specified client |
|------------|• <MAC> – Optional. Displays detailed TSPEC information for a specified client. Specify the MAC address of the client. |

<p>| on &lt;DEVICE-OR-DOMAIN-NAME&gt; | The following keyword is recursive and common to the ‘tspec &lt;MAC&gt;’ parameter: |
|----------------------------|• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays detailed TSPEC information for wireless clients on a specified device or RF Domain |
|                            |• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show wireless client {include-ipv6} {detail &lt;MAC&gt;} {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</code></td>
<td>Displays wireless client information. Optional parameters are added.</td>
</tr>
<tr>
<td><strong>wireless</strong></td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td><strong>client</strong></td>
<td>Displays client information based on the parameters passed</td>
</tr>
<tr>
<td><strong>include-ipv6</strong></td>
<td>Includes IPv6 address (if known) of wireless clients</td>
</tr>
<tr>
<td><strong>detail &lt;MAC&gt;</strong></td>
<td>Optional. Displays detailed wireless client(s) information</td>
</tr>
<tr>
<td>• &lt;MAC&gt; – Optional. Displays detailed information for a specified wireless client. Specify the MAC address of the client.</td>
<td></td>
</tr>
<tr>
<td><strong>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</strong></td>
<td>The following keyword is recursive and common to the ‘detail &lt;MAC&gt;’ parameter:</td>
</tr>
<tr>
<td>• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays detailed information on a specified device or RF Domain</td>
<td></td>
</tr>
<tr>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`show wireless client {include-ipv6} {filter {ip</td>
<td>ipv6</td>
</tr>
<tr>
<td><strong>wireless</strong></td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td><strong>client</strong></td>
<td>Displays client information based on the parameters passed</td>
</tr>
<tr>
<td><strong>include-ipv6 {filter}</strong></td>
<td>Optional. Includes IPv6 address (if known) of wireless clients</td>
</tr>
<tr>
<td>• filter – Optional. Defines additional filters. Use one of the following options to filter clients: ip, ipv6, state, and wlan</td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> By default the system only displays the IPv4 address of clients. The include-ipv6 parameter includes the known IPv6 address of each client.</td>
<td></td>
</tr>
<tr>
<td>**ip [&lt;IPv4&gt;</td>
<td>not &lt;IPv4&gt;]**</td>
</tr>
<tr>
<td>• &lt;IPv4&gt; – Displays information of the client identified by the &lt;IPv4&gt; parameter</td>
<td></td>
</tr>
<tr>
<td>• not &lt;IPv4&gt; – Inverts the match selection</td>
<td></td>
</tr>
<tr>
<td>**ipv6 [&lt;IPv6&gt;</td>
<td>not &lt;IPv6&gt;]**</td>
</tr>
<tr>
<td>• &lt;IPv6&gt; – Displays information of the client identified by the &lt;IPv6&gt; parameter</td>
<td></td>
</tr>
<tr>
<td>• not &lt;IPv6&gt; – Inverts the match selection</td>
<td></td>
</tr>
<tr>
<td>**filter state [data-ready</td>
<td>not [data-ready</td>
</tr>
<tr>
<td>• data-ready – Displays information of wireless clients in the data-ready state</td>
<td></td>
</tr>
<tr>
<td>• not [data-ready</td>
<td>roaming] – Inverts match selection. Displays information of wireless clients neither ready nor roaming</td>
</tr>
<tr>
<td>• Roaming – Displays information of roaming clients</td>
<td></td>
</tr>
<tr>
<td>**wlan [&lt;WLAN-NAME&gt;</td>
<td>not &lt;WLAN-NAME&gt;]**</td>
</tr>
<tr>
<td>• &lt;WLAN-NAME&gt; – Specify the WLAN name.</td>
<td></td>
</tr>
<tr>
<td>• not &lt;WLAN-NAME&gt; – Inverts match selection</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`show wireless coverage-hole-incidents {detail} {filter {ap &lt;MAC/HOSTNAME&gt;</td>
<td>client-mac &lt;MAC&gt;}}{summary} {on &lt;DOMAIN-NAME&gt;}`</td>
</tr>
<tr>
<td><strong>wireless</strong></td>
<td>Displays wireless configuration parameters. Use this option to view coverage-hole related incidents encountered by wireless clients and reported to associated access points.</td>
</tr>
<tr>
<td><strong>coverage-hole-incidents</strong></td>
<td>Displays coverage-hole related statistics</td>
</tr>
</tbody>
</table>
**detail filters**

```
[ap <MAC/ HOSTNAME>| client-mac <MAC>]
```

Optional. Displays detailed coverage-hole related statistics

- filters – Optional. Displays detailed coverage-hole related statistics on a per access point or wireless-client basis
  - ap <MAC/HOSTNAME> – Displays detailed coverage-hole related statistics for a specified access point
  - <MAC/HOSTNAME> – Specify the access point’s device name or MAC address.
- client-mac <MAC> – Displays detailed coverage-hole related statistics encountered by a specified wireless client
  - <MAC> – Specify the wireless client’s MAC address

**Note:** If the command is executed without any parameters being included, the system displays all coverage-hole related statistics.

**summary**

Optional. Displays a summary of coverage-hole related statistics

**on <DOMAIN-NAME>**

This parameter is recursive and is common to the ‘detail’ and ‘summary’ keywords:

- on <DOMAIN-NAME> – Optional. Displays detailed or summary coverage-hole related statistics on a specified RF Domain
  - <DOMAIN-NAME> – Specify the domain name.

- show wireless meshpoint {config} {filter [device <DEVICE-NAME>|rf-domain <DOMAIN-NAME>]}

**wireless**

Displays wireless configuration parameters. Use this option to view detailed statistics on each Mesh-capable client available within controller’s adopted access point’s radio coverage area.

A mesh network is where one where each node is able to communicate with other nodes and maintain more then one path to the other mesh nodes within the mesh network. A mesh network provides robust, reliable and redundant connectivity to all the members of the mesh network. When one member of the mesh network becomes unavailable, the other mesh nodes are still able to communicate with one another either directly or indirectly through intermediate nodes.

**meshpoint**

Displays meshpoint related information

**config**

Optional. Displays all meshpoint configuration

**filters**

```
[device <DEVICE-NAME>|rf-domain <DOMAIN-NAME>]
```

Optional. Provides additional filter options, such as device name and RF Domain name.

- device <DEVICE-NAME> – Displays meshpoints applied to a specified device
  - <DEVICE-NAME> – Specify the device name.
- rf-domain – <DOMAIN-NAME> – Displays meshpoints applied to a specified RF Domain
  - <DOMAIN-NAME> – Specify the domain name.

- show wireless meshpoint {detail} {<MESHPOINT-NAME>}

**wireless**

Displays wireless configuration parameters

**meshpoint**

Displays meshpoint related information. Use this option to view detailed statistics on each Mesh-capable client available within controller’s adopted access point’s radio coverage area.

Contd..
A mesh network is where one where each node is able to communicate with other nodes and maintain more then one path to the other mesh nodes within the mesh network. A mesh network provides robust, reliable and redundant connectivity to all the members of the mesh network. When one member of the mesh network becomes unavailable, the other mesh nodes are still able to communicate with one another either directly or indirectly through intermediate nodes.

| detail | Optional. Displays detailed information for all meshpoints or a specified meshpoint |
| <MESHPOINT-NAME> | • <MESHPOINT-NAME> – Optional. Displays detailed information for a specified meshpoint. Specify the meshpoint name. |

• show wireless meshpoint {multicast|path|proxy|root|security|statistics} [<MESHPOINT-NAME>|detail] {on <DEVICE-OR-DOMAIN-NAME>}

| wireless | Displays wireless configuration parameters |
| meshpoint | Displays meshpoint related information. Use this option to view detailed statistics on each Mesh-capable client available within controller’s adopted access point’s radio coverage area. A mesh network is where one where each node is able to communicate with other nodes and maintain more then one path to the other mesh nodes within the mesh network. A mesh network provides robust, reliable and redundant connectivity to all the members of the mesh network. When one member of the mesh network becomes unavailable, the other mesh nodes are still able to communicate with one another either directly or indirectly through intermediate nodes. |
| multicast | Optional. Displays meshpoint multicast information |
| path | Optional. Displays meshpoint path information |
| proxy | Optional. Displays meshpoint proxy information |
| root | Optional. Displays meshpoint root information |
| security | Optional. Displays meshpoint security information |
| statistics | Optional. Displays meshpoint statistics |

[<MESHPOINT-NAME>| detail] The following keywords are common to all of the above parameters: 
• <MESHPOINT-NAME> – Displays meshpoint related information for a specified meshpoint. Specify the meshpoint name. 
• detail – Displays detailed multicast information for all meshpoints 

on <DEVICE-OR-DOMAIN-NAME> The following keyword is common to all of the above parameters: 
• on <DEVICE-OR-DOMAIN-NAME> – Optional. Displays detailed multicast information on a specified device or RF Domain. 
• <DEVICE-OR-DOMAIN-NAME> – Specify the name of the AP, wireless controller, service platform, or RF Domain.

• show wireless meshpoint {neighbor} [<MESHPOINT-NAME>|detail|statistics {rf}] {on <DEVICE-OR-DOMAIN-NAME>}

<p>| wireless | Displays wireless configuration parameters |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show wireless meshpoint {tree} {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</code></td>
<td>Displays meshpoint related information. Use this option to view detailed statistics on each Mesh-capable client available within controller’s adopted access point’s radio coverage area. A mesh network is where one where each node is able to communicate with other nodes and maintain more than one path to the other mesh nodes within the mesh network. A mesh network provides robust, reliable and redundant connectivity to all the members of the mesh network. When one member of the mesh network becomes unavailable, the other mesh nodes are still able to communicate with one another either directly or indirectly through intermediate nodes.</td>
</tr>
<tr>
<td>`show wireless meshpoint {usage-mappings</td>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;}`</td>
</tr>
<tr>
<td><code>show wireless mobility-database {on &lt;DEVICE-NAME&gt;}</code></td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td><code>meshpoint</code></td>
<td>Displays meshpoint related information. Use this option to view detailed statistics on each Mesh-capable client available within controller’s adopted access point’s radio coverage area. A mesh network is where one where each node is able to communicate with other nodes and maintain more than one path to the other mesh nodes within the mesh network. A mesh network provides robust, reliable and redundant connectivity to all the members of the mesh network. When one member of the mesh network becomes unavailable, the other mesh nodes are still able to communicate with one another either directly or indirectly through intermediate nodes.</td>
</tr>
<tr>
<td><code>neighbor</code></td>
<td>Optional. Displays meshpoint neighbor information, based on the parameters passed. Select one of the following parameter to view neighbor related information: • <code>&lt;MESHPOINT-NAME&gt;</code> – Displays detailed multicast information for a specified meshpoint. Specify the meshpoint name. • <code>detail</code> – Displays detailed multicast information for all meshpoints • <code>statistics</code> – Displays neighbors related statistics • <code>rf</code> – Optional. Displays RF related statistics for neighbors</td>
</tr>
<tr>
<td>`&lt;MESHPOINT-NAME&gt;</td>
<td>[detail] statistics {rf}]`</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>The following keyword is common to all of the above parameters: • <code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Optional. Displays meshpoint neighbor information, based on the parameters passed, on a specified device or RF Domain. • <code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Optional. Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
<tr>
<td><code>wireless</code></td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td><code>meshpoint</code></td>
<td>Displays meshpoint related information. Use this option to view detailed statistics on each Mesh-capable client available within controller’s adopted access point’s radio coverage area. A mesh network is where one where each node is able to communicate with other nodes and maintain more than one path to the other mesh nodes within the mesh network. A mesh network provides robust, reliable and redundant connectivity to all the members of the mesh network. When one member of the mesh network becomes unavailable, the other mesh nodes are still able to communicate with one another either directly or indirectly through intermediate nodes.</td>
</tr>
<tr>
<td><code>tree</code></td>
<td>Optional. Displays meshpoint network tree on a specified device or RF Domain.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>Optional. Displays meshpoint network tree on a specified device or RF Domain. • <code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Optional. Specify the name of the AP, wireless controller, service platform, or RF Domain</td>
</tr>
<tr>
<td><code>wireless</code></td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td><code>meshpoint</code></td>
<td>Displays meshpoint related information. Use this option to view detailed statistics on each Mesh-capable client available within controller’s adopted access point’s radio coverage area. A mesh network is where one where each node is able to communicate with other nodes and maintain more than one path to the other mesh nodes within the mesh network. A mesh network provides robust, reliable and redundant connectivity to all the members of the mesh network. When one member of the mesh network becomes unavailable, the other mesh nodes are still able to communicate with one another either directly or indirectly through intermediate nodes.</td>
</tr>
<tr>
<td><code>usage-mappings</code></td>
<td>Optional. Lists all devices and profiles using the meshpoint.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>Optional. Displays meshpoint applied to a specified device or RF Domain. • <code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Optional. Specify the name of the AP, wireless controller, service platform, or RF Domain</td>
</tr>
<tr>
<td><code>wireless</code></td>
<td>Displays wireless configuration parameters</td>
</tr>
</tbody>
</table>
### mobility-database
Displays controller-assisted mobility database

<table>
<thead>
<tr>
<th>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</th>
<th>The following keyword is recursive and common to the 'filter &lt;RADIO-MAC&gt;' parameter:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays detailed radio operation</td>
</tr>
<tr>
<td></td>
<td>status for all or a specified radio on a specified device or RF Domain.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller,</td>
</tr>
<tr>
<td></td>
<td>service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

### show wireless mint [client|detail] {portal-candidates {<DEVICE-NAME>|filter <RADIO-MAC>]|statistics} (on <DEVICE-OR-DOMAIN-NAME>)

### wireless mint [client|detail]
Displays radio MiNT-mesh related statistics
- client – Displays MiNT-mesh client related information. Use the 'client' option to view detailed statistics on each Mesh capable client available within the selected access point's radio coverage area.
- detail – Displays detailed MiNT-mesh related information

### portal-candidates
Displays detailed information about portal candidates for a MiNT-mesh. Mesh points connected to an external network and forwarding traffic in and out are Mesh portals. Mesh points must find paths to a portal to access the Internet. When multiple portals exist, the mesh point must select one.
Use the additional filter option to view specific portal candidate details.

### statistics
This option is common to the 'client' and 'detail' keyword. Displays MiNT-mesh client statistical data

<table>
<thead>
<tr>
<th>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</th>
<th>This option is common to the 'client' and 'detail' keyword. Displays MiNT-mesh client related information on a specific device or RF Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the access point, controller, or RF Domain</td>
</tr>
</tbody>
</table>

### how wireless mint portal statistics {on <DEVICE-OR-DOMAIN-NAME>}

### wireless mint
Displays radio MiNT-mesh related statistics

### links
Displays MiNT-mesh links related information. MiNT Links are automatically created between controllers and access points during adoption using MLCP (*MiNT Link Creation Protocol*). They can also be manually created between a controller and access point (or) between access points. MiNT links are manually created between controllers while configuring a cluster. Level 2 (or) remote MiNT links are controller aware links, and requires IP network for communication. This level 2 MiNT links at access points are intended for remote adaptive AP deployment and management from NOC. With Level2 MiNT links, access points are only aware of the controllers and not about other access points. Level 2 MiNT links also provide partitioning, between access points deployed at various remote sites.

<table>
<thead>
<tr>
<th>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</th>
<th>Displays MiNT-mesh links on a specific device or RF Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the access point, controller, or RF Domain</td>
</tr>
</tbody>
</table>

### show wireless mint portal statistics {on <DEVICE-OR-DOMAIN-NAME>}

### wireless mint
Displays radio MiNT-mesh related statistics
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`show wireless radio {detail} {&lt;DEVICE-NAME&gt; {&lt;1-3&gt;</td>
<td>filter</td>
</tr>
<tr>
<td>wireless</td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td>radio</td>
<td>Displays radio operation status and other related information. Use this option to view radio association data, including radio ID, connected APs, radio type, quality index and Signal to Noise Ratio (SNR). This data is reported to the managing controller or service platform from connected access point radios and should be refreshed periodically. A radio’s RF Mode displays as: 2.4GHz-wlan – If it is configured to provide 2.4 GHz WLAN service; 5GHz-wlan – If it is configured to provide 5.0 GHz WLAN service; bridge – If it is configured to provide client-bridge operation.</td>
</tr>
<tr>
<td>detail</td>
<td>Optional. Displays detailed radio operation status</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays detailed information for a specified radio. Specify the MAC address or hostname, or append the interface number to form the radio ID in the AA-BB-CC-DD-EE-FF:RX or HOSTNAME:RX format.</td>
</tr>
<tr>
<td>&lt;1-3&gt;</td>
<td>Optional. Specify the radio interface index from 1 - 3 (if not specified as part of the radio ID)</td>
</tr>
<tr>
<td>filter &lt;RADIO-MAC&gt;</td>
<td>Optional. Provides additional filters. &lt;RADIO-MAC&gt; – Uses MAC address to filter radios.</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. After specifying the radio MAC address, further refine the search by specifying a device or RF Domain. &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
<tr>
<td><code>show wireless radio {detail} {filter &lt;RADIO-MAC&gt;} {&lt;on &lt;DEVICE-OR-DOMAIN-NAME&gt;}}</code></td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td>wireless</td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td>radio</td>
<td>Displays radio operation status and other related information. Use this option to view radio association data, including radio ID, connected APs, radio type, quality index and Signal to Noise Ratio (SNR). This data is reported to the managing controller or service platform from connected access point radios and should be refreshed periodically. A radio’s RF Mode displays as: 2.4GHz-wlan – If it is configured to provide 2.4 GHz WLAN service; 5GHz-wlan – If it is configured to provide 5.0 GHz WLAN service; bridge – If it is configured to provide client-bridge operation.</td>
</tr>
<tr>
<td>detail</td>
<td>Optional. Displays detailed radio operation status</td>
</tr>
<tr>
<td>filter &lt;RADIO-MAC&gt;</td>
<td>Optional. Provides additional filter options. &lt;RADIO-MAC&gt; – Uses MAC address to filter radios.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><code>show wireless radio</code></td>
<td>Displays wireless configuration parameters. Use this option to view radio association data, including radio ID, connected APs, radio type, quality index and SNR. This data is reported to the managing controller or service platform from connected access point radios and should be refreshed periodically.</td>
</tr>
</tbody>
</table>
| `radio` | Displays radio operation status and other related information. Use this option to view radio association data, including radio ID, connected APs, radio type, quality index and SNR. This data is reported to the managing controller or service platform from connected access point radios and should be refreshed periodically. A radio's RF Mode displays as:  
  - **2.4GHz-wlan** – If it is configured to provide 2.4 GHz WLAN service  
  - **5GHz-wlan** – If it is configured to provide 5.0 GHz WLAN service  
  - **bridge** – If it is configured to provide client-bridge operation |
| `statistics` | Optional. Displays radio traffic and RF statistics. Use additional filters to view specific details. The options are:  
  - **detail** – Displays detailed traffic and RF statistics of all radios  
  - **window-data** – Displays historical data over a time window  

The following keywords are common to the ‘detail’ and ‘window-data’ parameters:  
  - **<DEVICE-NAME>** – Optional. Specify the MAC address or hostname, or append the interface number to form the radio ID in the AA-BB-CC-DD-EE-FF:RX or HOSTNAME:RX format. |
### show wireless radio

- `{tspec}`
- `{<DEVICE-NAME>|filter|on <DEVICE-OR-DOMAIN-NAME>|option}`

- **<1-3>>** Optional. Specify the radio interface index from 1-3, if not specified as part of the radio ID using the preceding parameter.
- **filter <RADIO-MAC>** Optional. Provides additional filters
  - `<RADIO-MAC>` – Optional. Filters based on the radio MAC address
- **on <DEVICE-OR-DOMAIN-NAME>** Optional. After specifying the radio MAC address, further refine the search by specifying a device or RF Domain.
  - `<DEVICE-OR-DOMAIN-NAME>` – Specify the name of the AP, wireless controller, service platform, or RF Domain.

### show wireless regulatory

- `[channel-info <WORD>|county-code <WORD>]`

- **wireless** Displays wireless configuration parameters
- **regulatory** Displays wireless regulatory information
- **channel-info <WORD>** Displays channel information
  - `<WORD>` – Specify the channel number.
- **country-code <WORD>** Displays country code to country name information
  - `<WORD>` – Specify the two letter ISO-3166 country code.

### show wireless regulatory device-type

- `[ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap7131|ap7161|ap7181|ap7502|ap7522|ap7532|ap7562|ap8132|ap8163|ap82xx|ap8432|ap8533|rf54000] <WORD>`

- **wireless** Displays wireless configuration parameters
- **regulatory** Displays wireless regulatory information
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show wireless rf-domain statistics {detail} {(on &lt;DEVICE-OR-DOMAIN-NAME&gt;)}</td>
<td>Displays RF Domain statistics. The following keyword is recursive and common to the ‘detail’ parameter: on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays RF Domain statistics on a specified device or RF Domain.</td>
</tr>
<tr>
<td>show wireless sensor-server {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>Displays AirDefense sensor server configuration details. The following keyword is recursive and common to the ‘on’ parameter: on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays AirDefense sensor server configuration on a specified device or RF Domain.</td>
</tr>
<tr>
<td>show wireless unsanctioned aps {detailed</td>
<td>statistics} {(on &lt;DEVICE-OR-DOMAIN-NAME&gt;)}</td>
</tr>
<tr>
<td>show wireless wips [client-blacklist</td>
<td>event-history] {(on &lt;DEVICE-OR-DOMAIN-NAME&gt;)}</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><code>show wlan</code></td>
<td>Displays WLAN related information based on the parameters passed.</td>
</tr>
<tr>
<td>`show wlan {config filter {device &lt;DEVICE-NAME&gt;</td>
<td>rf-domain &lt;DOMAIN-NAME&gt;}}`</td>
</tr>
<tr>
<td>`show wlan {statistics {&lt;WLAN&gt;</td>
<td>detail} {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}}`</td>
</tr>
</tbody>
</table>

The following keyword is common to the ‘client-blacklist’ and ‘event-history’ parameters:
- `on <DEVICE-OR-DOMAIN-NAME>` – Optional. Displays the WIPS details on a specified device or RF Domain.
- `<DEVICE-OR-DOMAIN-NAME>` – Specify the name of the AP, wireless controller, service platform, or RF Domain.

- `<WLAN>` – Specify the WLAN name.
- `<DEVICE-OR-DOMAIN-NAME>` – Specify the name of the AP, wireless controller, service platform, or RF Domain.
Usage Guidelines

The customize command enables you to customize the `show > wireless` command output.

```bash
rfs7000-37FABE(config)#customize ?
cdp-lldp-info-column-width Customize cdp-lldp-info column width
hostname-column-width Customize hostname column width
show-adoption-offline Customize the output of (show adoption offline) command
show-adoption-status Customize the output of (show adoption status) command
show-wireless-bridge Customize the output of (show wireless bridge) command
show-wireless-bridge-hosts Customize the output of (show wireless bridge hosts) command
show-wireless-bridge-stats Customize the output of (show wireless bridge stats) command
show-wireless-bridge-stats-rf Customize the output of (show wireless bridge stats rf) command
show-wireless-bridge-stats-traffic Customize the output of (show wireless bridge stats traffic) command
show-wireless-client Customize the output of (show wireless client) command
show-wireless-client-stats Customize the output of (show wireless client stats) command
show-wireless-client-stats-rf Customize the output of (show wireless client stats rf) command
show-wireless-legacy-mesh-client-stats Customize the output of (show wireless mint client stats) command
show-wireless-meshpoint Customize the output of (show wireless meshpoint) command
show-wireless-meshpoint-accelerated-multicast Customize the output of (show wireless meshpoint accelerated-multicast) command
show-wireless-meshpoint-neighbor-stats Customize the output of (show wireless meshpoint neighbor stats) command
show-wireless-meshpoint-neighbor-stats-rf Customize the output of (show wireless meshpoint neighbor stats rf) command
show-wireless-mint-client Customize the output of (show wireless mint client) command
show-wireless-mint-client-stats Customize the output of (show wireless mint client stats) command
show-wireless-mint-client-stats-rf Customize the output of (show wireless mint client stats rf) command
show-wireless-mint-portal Customize the output of (show wireless mint portal) command
show-wireless-mint-portal-stats Customize the output of (show wireless mint portal stats) command
show-wireless-mint-portal-stats-rf Customize the output of (show wireless mint portal stats rf) command
show-wireless-radio Customize the output of (show wireless radio) command
show-wireless-radio-stats Customize the output of (show wireless radio stats) command
show-wireless-radio-stats-rf Customize the output of (show wireless radio stats rf) command
rfs7000-37FABE(config)#
```
The default setting for the `show > wireless > client` command is as follows:

```
rfs7000-37FABE(config)#show wireless client
------------------------------------- IPV4  VENDOR RADIO-ID WLAN VLAN STATE
-------------------------------------
-------------------------------------
-------------------------------------
Total number of wireless clients displayed: 0
rfs7000-37FABE(config)#
```

The above output can be customized, using the `customize > show-wireless-client` command, as follows:

```
rfs7000-37FABE(config)#customize show-wireless-client mac ip vendor vlan radio-id state wlan location radio-alias radio-type
rfs7000-37FABE(config)#commit
```

```
rfs7000-37FABE(config)#show wireless client
------------------------------------- AP-LOCATION RADIO RADIO-TYPE
-------------------------------------
-------------------------------------
-------------------------------------
-------------------------------------
Total number of wireless clients displayed: 0
rfs7000-37FABE(config)#
```

For more information on the `customize` command, see [customize](#).

**Examples**

```
nx9500-6C8809(config)#show wireless wlan config
------------------------------------- ENABLE SSID ENCRYPTION AUTHENTICATION VLAN BRIDGING MODE
-------------------------------------
-------------------------------------
test Y test wep64 none 1 local
-------------------------------------
nx9500-6C8809(config)#
nx9500-6C8809(config)#show wireless wips client-blacklist
No wireless clients blacklisted
nx9500-6C8809(config)#
rfs7000-37FABE(config)#show wireless regulatory channel-info 1
Center frequency for channel 1 is 2412MHz
rfs7000-37FABE(config)#
nx9500-6C8809(config)#show wireless regulatory country-code
------------------------------------- ISO CODE NAME
-------------------------------------
-------------------------------------
gt                     Guatemala
go                     Colombia
cn                     China
cm                     Cameroon
c1                     Chile
cs                     Albania
c1                     Canada
gy                     Guyana
gu                     Hungary
--More--
nx9500-6C8809(config)#
```
nx9500-6C8809(config)#show wireless regulatory device-type ap650 us

* * *

<table>
<thead>
<tr>
<th>#</th>
<th>Channel Set</th>
<th>Power(mW)</th>
<th>Power (dBm)</th>
<th>Placement</th>
<th>DFS</th>
<th>CAC(mins)</th>
<th>TPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-11</td>
<td>4000</td>
<td>36</td>
<td>Indoor/Outdoor</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2</td>
<td>36-48</td>
<td>200</td>
<td>23</td>
<td>Indoor</td>
<td>Not Required</td>
<td>0</td>
<td>Not Required</td>
</tr>
<tr>
<td>3</td>
<td>52-64</td>
<td>500</td>
<td>27</td>
<td>Indoor/Outdoor</td>
<td>Required</td>
<td>1</td>
<td>Not Required</td>
</tr>
<tr>
<td>4</td>
<td>52-64</td>
<td>1000</td>
<td>30</td>
<td>Indoor/Outdoor</td>
<td>Required</td>
<td>1</td>
<td>Required</td>
</tr>
<tr>
<td>5</td>
<td>100-116</td>
<td>500</td>
<td>27</td>
<td>Indoor/Outdoor</td>
<td>Required</td>
<td>1</td>
<td>Not Required</td>
</tr>
<tr>
<td>6</td>
<td>100-116</td>
<td>1000</td>
<td>30</td>
<td>Indoor/Outdoor</td>
<td>Required</td>
<td>1</td>
<td>Required</td>
</tr>
<tr>
<td>7</td>
<td>132-140</td>
<td>500</td>
<td>27</td>
<td>Indoor/Outdoor</td>
<td>Required</td>
<td>1</td>
<td>Not Required</td>
</tr>
<tr>
<td>8</td>
<td>132-140</td>
<td>1000</td>
<td>30</td>
<td>Indoor/Outdoor</td>
<td>Required</td>
<td>1</td>
<td>Required</td>
</tr>
<tr>
<td>9</td>
<td>149-165</td>
<td>4000</td>
<td>36</td>
<td>Indoor/Outdoor</td>
<td>Not Required</td>
<td>0</td>
<td>Not Required</td>
</tr>
</tbody>
</table>

nx9500-6C8809(config)#

rfs7000-37FABE(config)#show wireless ap detail

AP: B4-C7-99-71-17-28
AP Name : ap8132-711728
Location : default
RF-Domain : default
Type : ap81xx
Model : AP-8132-66040-US
IP : 10.2.0.99
IPV6 : ::
Num of radios : 2
Num of clients : 0
Last Smart-RF time : not done
Stats update mode : auto
Stats interval : 31
Radio Modes :
  radio-1 : wlan
  radio-2 : wlan
Country-code : us
Site-Survivable : True
Last error :
Fault Detected : False
Power management information for ap81xx:
  Power management Mode : Auto
  Power management status : 3af
  Ethernet power status : all up
  Radio power status : all up

Total number of APs displayed: 1
rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show wireless ap load-balancing on rfs6000-81742D

Column Name Reference:
  Ap-Ld : Load of the AP as reported by it.
  Avg-Ld : Average AP load in the AP’s neighborhood.
  2.4g-Ld : 2.4GHz band load in the AP's neighborhood.
  5g-Ld : 5GHz band load in the AP's neighborhood.
  Ap-2.4g-Ch-Ld : Load in the AP's 2.4GHz channel in its neighborhood.
  Avg-2.4g-Ch-Ld : Average load of a 2.4GHz channel in AP's neighborhood.
  Ap-5g-Ch-Ld : Load in the AP's 5GHz channel in its neighborhood.
  Avg-5g-Ch-Ld : Average load of a 5GHz channel in AP's neighborhood.
  Allow-2.4g-Req : AP responds to client requests on 2.4ghz radio
  Allow-5g-Req : AP responds to client requests on 5ghz radio

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg-</td>
<td>Avg-</td>
<td>Allow</td>
<td>Allow</td>
<td>Load</td>
<td>Load</td>
<td>Load</td>
<td>Load</td>
<td>Load</td>
<td>Load</td>
<td>Load</td>
<td>Ratio</td>
<td>Band</td>
<td>2.4g-</td>
<td>2.4g-Ch-Ld</td>
<td>2.4g-Ch-Ld</td>
<td>5g-Ch-Ld</td>
<td>5g-Ch-Ld</td>
<td>Ratio</td>
<td>Ratio</td>
<td>Ch-Ld</td>
<td>Ch-Ld</td>
</tr>
</tbody>
</table>
rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show wireless ap on default

MODE : radio modes - W = WLAN, S=Sensor, ' ' (Space) = radio not present

AP-NAME           AP-LOCATION     RF-DOMAIN        AP-MAC            #RADIOS MODE
#CLIENT          IPv4                                    IPv6
---------------------------------------------------------------------------------------
ap8132-711728                     default          B4-C7-99-71-17-28       2 W-W         0
10.2.0.99                                      ::
---------------------------------------------------------------------------------------
Total number of APs displayed: 1

nx6500-31FABE(config)#

rfs4000-1B3596#show wireless meshpoint tree
1: c00466 [5 MPs(3 roots, 2 bound)]
   |- ap7131-96FAAC
       |- ap7131-96F998
       | |- ap7131-96F6B4
       | -ap622-7C0958
       | -ap650-33DF84
   |- ap622-7C0958
   |- ap650-33DF84
2: test [3 MPs(0 roots, 0 bound)]
   *- ap7131-96F998
   *- ap7131-96FAAC
   *- ap7131-96F6B4

Total number of meshes displayed: 2

rfs4000-1B3596#show wireless meshpoint

MESH              HOSTNAME          HOPS IS-ROOT CONFIG-AS-ROOT ROOT-HOSTNAME       ROOT-BOUND-TIME NEXT-HOP-HOSTNAME NEXT-HOP-USE-TIME
---------------------------------------------------------------------------------------
c00466            ap7131-96FAAC        1 NO      NO             ap7131-96FAAC       1 days 02:01:33 ap7131-96FAAC       1 days 02:01:33
                    ap7131-96F998        1 days 02:01:33
                    ap7131-96F6B4       0 YES     YES            N/A                             N/A
                    ap622-7C0958       0 YES     YES            N/A                             N/A
                    ap650-33DF84       0 YES     YES            N/A                             N/A
---------------------------------------------------------------------------------------
Total number of meshpoint displayed: 3

rfs4000-1B3596#show wireless meshpoint multicast detail
Multicast Paths @00-23-68-00-00-01 (ap6532-000001), mesh1 [00-23-68-2E-64-B2]

Group-Addr        Subscriber Name    Subscriber MPID     Timeout (mSecs)
---------------------------------------------------------------------------------------
01-00-5E-01-01-01 ap6532-000001       00-23-68-2E-64-B2 N/A
---------------------------------------------------------------------------------------
Total number of meshpoint displayed: 1

ap6532-000001#
show wireless meshpoint neighbor detail
Neighbors @00-23-68-00-00-01 (ap6532-000001), mesh1 [00-23-68-2E-64-B2]

<table>
<thead>
<tr>
<th>Neighbor Name</th>
<th>Neighbor MPID.IFID</th>
<th>Root Name</th>
<th>Root MPID</th>
<th>RMet Hops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Interface</td>
<td>Auth-State Resourced Rank LQ% LMet Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed 00-23-68-00-00-01:R2 Enabled</td>
<td>00-23-68-2E-97-60 115</td>
<td>97</td>
<td>87</td>
<td>20</td>
</tr>
<tr>
<td>Fixed 00-23-68-00-00-01:R2 Init</td>
<td>00-23-68-2E-97-60 99</td>
<td>97</td>
<td>86</td>
<td>30</td>
</tr>
<tr>
<td>Fixed 00-23-68-00-00-01:R1 Enabled</td>
<td>00-23-68-2E-97-60 99</td>
<td>96</td>
<td>94</td>
<td>0</td>
</tr>
<tr>
<td>Fixed 00-23-68-00-00-01:R1 Enabled</td>
<td>00-23-68-2E-97-60 99</td>
<td>96</td>
<td>93</td>
<td>30</td>
</tr>
<tr>
<td>Root 00-23-68-00-00-01:R2 Enabled</td>
<td>00-23-68-2E-97-60 99</td>
<td>96</td>
<td>94</td>
<td>0</td>
</tr>
<tr>
<td>Root 00-23-68-00-00-01:R2 Enabled</td>
<td>00-23-68-2E-97-60 99</td>
<td>96</td>
<td>93</td>
<td>30</td>
</tr>
</tbody>
</table>

Total number of meshpoint displayed: 1

show wireless meshpoint proxy detail
Proxies @00-23-68-00-00-01 (ap6532-000001), mesh1 [00-23-68-2E-64-B2]

<table>
<thead>
<tr>
<th>Destination Addr</th>
<th>Owner Name</th>
<th>Owner MPID</th>
<th>Persist</th>
<th>VLAN</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-23-68-00-00-01</td>
<td>ap6532-000001</td>
<td>00-23-68-2E-64-B2 Permanent 101 180654310</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>00-1E-E5-A6-66-E2</td>
<td>ap6532-000001</td>
<td>00-23-68-2E-64-B2 Untimed 103 231920</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total number of meshpoint displayed: 1

show wireless meshpoint multicast mesh1
Multicast Paths @00-23-68-00-00-01 (ap6532-000001), mesh1 [00-23-68-2E-64-B2]

<table>
<thead>
<tr>
<th>Group-Addr</th>
<th>Subscriber Name</th>
<th>Subscriber MPID</th>
<th>Timeout (mSecs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-00-5E-01-01-01</td>
<td>ap6532-000001</td>
<td>00-23-68-2E-64-B2</td>
<td>-1</td>
</tr>
</tbody>
</table>

Total number of meshpoint displayed: 1

show wireless meshpoint path detail
Paths @00-23-68-00-00-01 (ap6532-000001), mesh1 [00-23-68-2E-64-B2]

<table>
<thead>
<tr>
<th>Destination Name</th>
<th>Destination Addr</th>
<th>Next Hop Name</th>
<th>Next Hop IFID</th>
<th>State Hops</th>
<th>Type</th>
<th>Binding</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-23-68-2E-AB-50</td>
<td>00-23-68-2E-AB-50</td>
<td>Valid 1</td>
<td>Root Bound</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>89 8730</td>
<td>0 23847</td>
<td>68.31.19.58</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>00-23-68-2E-97-60</td>
<td>00-23-68-2E-97-60</td>
<td>Valid 1</td>
<td>Root Unbound</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>92 5200</td>
<td>0 3481</td>
<td>68.31.1A.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total number of meshpoint displayed: 1
rfs4000-22A24E#show wireless client

<table>
<thead>
<tr>
<th>MAC</th>
<th>IP</th>
<th>VENDOR</th>
<th>RADIO-ID</th>
<th>WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Report start on RF-Domain: qs1

<table>
<thead>
<tr>
<th>VLAN</th>
<th>STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Report end on RF-Domain: qs1

<table>
<thead>
<tr>
<th>MAC</th>
<th>IP</th>
<th>VENDOR</th>
<th>RADIO-ID</th>
<th>WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-01-02-03-04-10</td>
<td>2.3.4.16</td>
<td>3Com Corp</td>
<td>00-01-02-03-04-00:R1</td>
<td>sim-wlan-1</td>
</tr>
<tr>
<td>00-01-02-03-05-10</td>
<td>2.3.5.16</td>
<td>3Com Corp</td>
<td>00-01-02-03-04-00:R2</td>
<td>sim-wlan-1</td>
</tr>
</tbody>
</table>

Report end on RF-Domain: Store-1

---

Total number of clients displayed: 2

rfs4000-22A24E#

The following examples show client-bridge related information:

NX9500(config)#show adoption status

<table>
<thead>
<tr>
<th>DEVICE-NAME</th>
<th>VERSION</th>
<th>CFG-STAT</th>
<th>MSGS</th>
<th>ADOPTED-BY</th>
<th>LAST-ADOPTION</th>
<th>UPTIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap6562-167598</td>
<td>5.8.4.0-008D</td>
<td>configured</td>
<td>No</td>
<td>NX9500</td>
<td>0 days 00:01:59</td>
<td>0 days 00:03:22</td>
</tr>
</tbody>
</table>

Total number of devices displayed: 1

NX9500(config)#

NX9500(config)#show wireless bridge on ap6562-167598

<table>
<thead>
<tr>
<th>LOCAL RADIO</th>
<th>LOCAL BSSID</th>
<th>SELECTED AP</th>
<th>RF-BAND</th>
<th>CHANNEL</th>
<th>STATE</th>
<th>UP TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>(sec ago)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ap6562-167598:R2 FC-0A-81-16-69-50 B4-C7-99-CA-A1-F0 5GHz  104 Selected 0 days 00:01:55 00:00:00

Total number of radios displayed: 1

NX9500(config)#
### Show Commands 6-181

#### NX9500(config)# show wireless bridge config

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>SSID</th>
<th>BAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap6562-167598</td>
<td>FC-0A-81-16-75-98</td>
<td>default-ap6562</td>
<td>default</td>
<td>inf_ap</td>
<td>2.4GHz/5GHz</td>
</tr>
</tbody>
</table>

#### NX9500(config)# show wireless bridge hosts

<table>
<thead>
<tr>
<th>HOST</th>
<th>BRIDGE MAC</th>
<th>IP</th>
<th>BRIDGING STATUS</th>
<th>ACTIVITY (sec ago)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-0A-81-16-75-98</td>
<td>FC-0A-81-16-69-50</td>
<td>172.16.34.55</td>
<td>UP</td>
<td>00:00:00</td>
</tr>
</tbody>
</table>

Total number of hosts displayed: 1

#### NX9500(config)# show wireless bridge statistics

<table>
<thead>
<tr>
<th>LOCAL RADIO</th>
<th>CONNECTED AP</th>
<th>SIGNAL (dbm)</th>
<th>SNR</th>
<th>TX-RATE (Mbps)</th>
<th>RX-RATE (Mbps)</th>
<th>Tx bps</th>
<th>Rx bps</th>
<th>RETRY</th>
<th>AVG</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap6562-167598:R2</td>
<td>B4-C7-99-CA-A1-F0</td>
<td>-52</td>
<td>50</td>
<td>53</td>
<td>36</td>
<td>1 k</td>
<td>3 k</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Total number of radios displayed: 1

#### NX9500(config)# show wireless bridge candidate-ap on ap6562-167598

**Client Bridge Candidate APs:**

<table>
<thead>
<tr>
<th>AP-MAC</th>
<th>BAND</th>
<th>CHANNEL</th>
<th>SIGNAL (dbm)</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4-C7-99-CA-A1-F0</td>
<td>5 GHz</td>
<td>104</td>
<td>-39</td>
<td>selected</td>
</tr>
</tbody>
</table>

Total number of candidates displayed: 1

#### NX9500(config)# show wireless bridge certificate status on ap6562-167598

Certificate Last Updated Status: Thu Jul 23 11:41:40 2015

NX9500(config)#
6.1.76 **wwan**  

_**show commands**_

Displays wireless WAN status

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`show wwan [configuration|status] {on <DEVICE-OR-DOMAIN-NAME>}`

**Parameters**

- `show wwan [configuration|status] {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>wwan</code></td>
<td>Displays wireless WAN configuration and status details</td>
</tr>
<tr>
<td><code>configuration</code></td>
<td>Displays wireless WAN configuration information</td>
</tr>
<tr>
<td><code>status</code></td>
<td>Displays wireless WAN status information</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>The following keyword is common to the 'configuration' and 'status' parameters:</td>
</tr>
<tr>
<td></td>
<td>• <code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Optional. Displays configuration or status</td>
</tr>
<tr>
<td></td>
<td>details on a specified device or RF Domain</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – Specify the AP, wireless controller, service</td>
</tr>
<tr>
<td></td>
<td>platform, or RF Domain name.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs4000-229D58(config-device-00-23-68-22-9D-58)#show wwan configuration
>>> WWAN Configuration:
+-------------------------------------------
| Access Port Name : isp.cingular            |
| User Name        : testuser                |
| Cryptomap        : map1                    |
+-------------------------------------------
rfs4000-229D58(config-device-00-23-68-22-9D-58)#
```

```bash
rfs4000-229D58(config-device-00-23-68-22-9D-58)#show wwan status
>>> WWAN Status:
+-------------------------------------------
| State : ACTIVE                            |
| DNS1  : 209.183.54.151                    |
| DNS2  : 209.183.54.151                    |
+-------------------------------------------
```
6.1.77 slot

Dispaly Peripheral Component Interconnect (PCI) express slot statistics. Use this command to view if the slots have been used for Team-Centro VM or WiNG support.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

show slot

**Parameters**

- show slot

| slot | Shows PCI express card statistics |

**Examples**

nx4500-5CFA2B>show slot

<table>
<thead>
<tr>
<th>SLOT</th>
<th>TYPE</th>
<th>MODULE</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>[]</td>
<td>wing</td>
<td>Enabled</td>
</tr>
<tr>
<td>2</td>
<td>[]</td>
<td>wing</td>
<td>Enabled</td>
</tr>
<tr>
<td>3</td>
<td>[]</td>
<td>wing</td>
<td>Enabled</td>
</tr>
<tr>
<td>4</td>
<td>[]</td>
<td>wing</td>
<td>Enabled</td>
</tr>
</tbody>
</table>

nx4500-5CFA2B>
6.1.78 smart-cache

Displays details on the cached entry for a specific URL or all URLs.

**NOTE:** Smart content caching is a licensed feature and can be enabled only if a license is procured and applied to the device. For more information, see `smart-cache-policy`.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

**Syntax**

```
show smart-cache [active-requests|clients|purge-requests|statistics content-type|storage] {on <DEVICE-NAME>}
```

**Parameters**
- `show smart-cache [active-requests|clients|purge-requests|statistics content-type|storage] {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>active-requests</td>
<td>Displays all current in-progress requests</td>
</tr>
<tr>
<td>clients</td>
<td>Displays all clients since the boot-up</td>
</tr>
<tr>
<td>purge-requests</td>
<td>Displays all requests that have been purged (cleared)</td>
</tr>
<tr>
<td>statistics content-type</td>
<td>Displays detailed cached content statistics</td>
</tr>
<tr>
<td>storage</td>
<td>Displays storage statistics in KB</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays smart-cache related information on a specified device</td>
</tr>
</tbody>
</table>

**Examples**

```
nx4500-5CFA2B>show smart-cache statistics
Warning: no smart-cache license installed, smart-cache is not running.
Warning: name-server not configured, smart-cache may not work.

--------------------------------------
| DURATION   |      DATA (KB)      | BANDWIDTH (Kbps)  |      REQUESTS |
|---------------|----------|----------|---------|---------|----------|----------|
| Since boot    |         0|         0|      0.0|      0.0|         0|         0|
--------------------------------------
nx4500-5CFA2B>
```

```
nx4500-5CFA2B(config)#show smart-cache statistics content-type

--------------------------------------
| DURATION   |      VIDEO (KB)     |      AUDIO (KB)     |      IMAGE (KB)     |      TEXT |
|---------------|----------|----------|----------|----------|-----|
| Since boot    |         0|         0|         0|         0|     0|
--------------------------------------
nx4500-5CFA2B(config)#
```
nx4500-5CFA2B# show smart-cache storage

<table>
<thead>
<tr>
<th></th>
<th>USED</th>
<th>TOTAL</th>
<th>USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 MB</td>
<td>DISABLED</td>
<td>DISABLED</td>
</tr>
</tbody>
</table>

nx4500-5CFA2B#
### 6.1.79 virtual-machine

#### show commands

Displays the virtual-machine (VM) configuration, logs, and statistics

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510

#### Syntax

- `show virtual-machine [configuration|debugging|export|statistics]`
- `show virtual-machine [configuration|statistics] {<VM-NAME>|team-urc|team-rls|team-vowlan} {(on <DEVICE-NAME>)}`
- `show virtual-machine debugging level {on <DEVICE-NAME>}`
- `show virtual-machine debugging level [debug|error|info|warning] {on <DEVICE-NAME>}`
- `show virtual-machine export <VM-NAME> {on <DEVICE-NAME>}`

The NX9500 and NX9510 series service platforms support ADSP and TEAM-CMT virtual machines only. The following show commands are specific to the NX9500 and NX9510 devices:

- `show virtual-machine [configuration|statistics] {<VM-NAME>|adsp|team-cmt}`

#### Parameters

- `virtual-machine`: Displays the following VM-related information: configuration or statistics
- `configuration`: Displays detailed VM configuration
- `statistics`: Displays VM statistics
- `<VM-NAME>`: Optional. Displays VM configuration or statistics for the virtual machine identified by the `<VM-NAME>` keyword. Specify the VM name.
- `team-urc`: Optional. Displays TEAM-URC (IP-PBX) VM configuration/statistics
- `team-rls`: Optional. Displays TEAM-RLS (Radio Link Server) VM configuration/statistics
- `team-vowlan`: Optional. Displays TEAM-VoWLAN (Voice over WLAN) VM configuration/statistics

**Note:** These keywords are specific to the NX45XX and NX65XX series service platforms.

- `on <DEVICE-NAME>`: Optional. Specifies the name of the device on which the command is executed
  - `<DEVICE-NAME>`: Specify the name of the service platform.

<table>
<thead>
<tr>
<th>virtual-machine</th>
<th>Displays the following VM-related information: configuration or statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>configuration</td>
<td>Displays detailed VM configuration</td>
</tr>
<tr>
<td>statistics</td>
<td>Displays VM statistics</td>
</tr>
<tr>
<td><code>&lt;VM-NAME&gt;</code></td>
<td>The following keywords are common to the ‘configuration’ and ‘statistics’ parameters:</td>
</tr>
<tr>
<td>team-urc</td>
<td>- <code>&lt;VM-NAME&gt;</code>: Optional. Displays VM configuration or statistics for the virtual machine identified by the <code>&lt;VM-NAME&gt;</code> keyword. Specify the VM name.</td>
</tr>
<tr>
<td>team-rls</td>
<td>- <code>team-urc</code>: Optional. Displays TEAM-URC (IP-PBX) VM configuration/statistics</td>
</tr>
<tr>
<td>team-vowlan</td>
<td>- <code>team-rls</code>: Optional. Displays TEAM-RLS (Radio Link Server) VM configuration/statistics</td>
</tr>
<tr>
<td></td>
<td>- <code>team-vowlan</code>: Optional. Displays TEAM-VoWLAN (Voice over WLAN) VM configuration/statistics</td>
</tr>
</tbody>
</table>

- `show virtual-machine [configuration|statistics] {<VM-NAME>|adsp|team-cmt} {on <DEVICE-NAME>}`
The following keywords are common to the 'configuration' and 'statistics' parameters:
- `<VM-NAME>` – Optional. Displays VM configuration or statistics for the virtual machine identified by the `<VM-NAME>` keyword. Specify the VM name.
- adsp – Optional. Displays Air-Defense Services Platform (ADSP) VM configuration/statistics
- team-cmt – Optional. Displays TEAM-CMT VM configuration/statistics

Note: These keywords are specific to the NX9500 and NX9510 service platforms.

Optional. Specifies the name of the device on which the command is executed
- `<DEVICE-NAME>` – Specify the name of the service platform.

Optional. Displays VM logs based on the level selected. The available options are:
- debug – Displays VM logs of level debug and above
- error – Displays VM logs of level error
- info – Displays VM logs of level Info and above
- warning – Displays logs of level warning and above

Note: The NX9500 and NX9510 series service platforms will display ADSP and TEAM-CMT VM debugging logs.

Optional. Specifies the name of the device on which the command is executed
- `<DEVICE-NAME>` – Specify the name of the service platform.

Optional. Displays VM configuration export related information for the virtual machine identified by the `<VM-NAME>` keyword. Specify the VM name.

Note: The NX9500 and NX9510 series service platforms will display ADSP and TEAM-CMT VM configuration export information

Optional. Specifies the name of the device on which the command is executed
- `<DEVICE-NAME>` – Specify the name of the service platform.

Examples
nx4500-5CFA2B#show virtual-machine configuration team-urc
VM: team-urc
  autostart : start
  bootloader : /usr/bin/pygrub
  cpus : ["3","2"]
  disk : file:/vms/test/team-centro/disk,xvda,w
  maxmem : 3584 MB
  maxvcpus : 2
  memory : 1200 MB
  name : team-urc
  on_crash : coredump-restart
  on_poweroff : destroy
  on_reboot : restart
  serial : pty
  tty : /dev/pts/1
  uuid : b80f8e19-a1f6-02c9-cbbc-10claeb0a170
vcpus : 1
vif : bridge=vm2br, mac=B4:C7:99:5C:FA:2F, script=vif-bridge, type=bridge
: bridge=brpriv, mac=00:16:3e:65:ff:01, script=vif-bridge
: bridge=vm3br, mac=B4:C7:99:5C:FA:31, script=vif-bridge, type=bridge

nx4500-5CFA2B#

nx4500-5CFA2B#show virtual-machine configuration

NAME | AUTOSTART | MEMORY (MB) | VCPUS
--- | --- | --- | ---
team-rls | start | 512 | 1
team-urc | start | 1200 | 1
team-vowlan | start | 1500 | 1

nx4500-5CFA2B#

nx4500-5CFA2B#show virtual-machine statistics

NAME | STATE | VCPUS | MEM (MB) | BRIDGE-IF | IP
--- | --- | --- | --- | --- | ---
WiNG | - | - | 1009 | - | -
team-rls | (not_installed) | 4 | 1009 | eth0 (vmif2) | 192.168.13.103
team-urc | Running | 1 | 1200 | - | -
team-vowlan | (not_installed) | - | - | - | -

nx4500-5CFA2B#

The following example shows WiNG memory allocation on a NX9500 device:

nx9500-6C874D#show virtual-machine statistics

NAME | STATE | VCPUS | MEM (MB) | BRIDGE-IF | IP
--- | --- | --- | --- | --- | ---
WiNG | - | - | 18432 | - | -
adsp | Halted | - | 12000 | unknown | -
team-cmt | Halted | - | 1024 | unknown | -

nx9500-6C874D#

nx9500-6C874D#show virtual-machine configuration

NAME | AUTOSTART | MEMORY (MB) | VCPUS
--- | --- | --- | ---
WiNG | - | 18432 | -
adsp | ignore | 12000 | 12
team-cmt | ignore | 1024 | 1

nx9500-6C874D#

nx9500-6C874D>show virtual-machine statistics adsp

VM name: adsp
Base Version : unknown
Install Status : not_installed
### 6.1.80 mirroring

- **show commands**

Displays the port mirroring sessions

For more information on configuring port mirroring sessions, see `mirror`.

Supported in the following platforms:

- Service Platforms — NX4524, NX6524

**Syntax**

`show mirroring`

**Parameters**

- `show mirroring`

<table>
<thead>
<tr>
<th>mirroring</th>
<th>Displays the port mirroring sessions</th>
</tr>
</thead>
</table>

**Examples**

```
nx4524-470984# show mirroring

<table>
<thead>
<tr>
<th>Session</th>
<th>Source</th>
<th>Destination</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ge3</td>
<td>ge24</td>
<td>any</td>
</tr>
<tr>
<td>2</td>
<td>ge7</td>
<td>ge24</td>
<td>inbound</td>
</tr>
<tr>
<td>3</td>
<td>ge5</td>
<td>ge24</td>
<td>outbound</td>
</tr>
</tbody>
</table>

nx4524-470984#
```
6.1.81 raid

show commands

Displays Redundant Array of Independent Disks (RAID) related information, such as array status, consistency check status, and RAID log.

Use this command to assess the RAID array’s drive utilization and whether the drives are currently online. Since there is only one RAID array controller reporting status to the service platform, it is important to know if other drives house hot spare drives as additional resources should one of the dedicated drives fail. This command also displays whether a physical within the RAID array has a drive installed, and whether the drive is currently online.

For more information on configuring RAID, see raid.

Supported in the following platforms:
- Service Platforms — NX9500

Syntax

show raid {on <DEVICE-NAME>}

Parameters

- show raid {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>raid</td>
<td>Displays the RAID array status and statistics</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays RAID status and statistics on a specified device</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
<td>- Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

Examples

nx9500-6C874D(config)#show raid
Logical drive info:
  Size 930 GB, State optimal
  Alarm enabled
  Last check: Sat Aug 10 02:56:54 2013
  Last check result: ending

Physical drive info:

  Drive 0: online
  Drive 1: online
  Drive 2: not-installed
  Drive 3: not-installed
  Drive 4: not-installed

nx9500-6C874D(config)#
Profiles enable administrators to assign a common set of configuration parameters, policies, WLANs, wireless parameters, and security parameters to service platforms, wireless controllers, and access points across a large, multi segment, site. The configuration parameters within a profile are based on the hardware model the profile was created to support.

The service platforms, wireless controllers, and access points support both default and user-defined profiles. Each default and user-defined profile contains policies and configurations that are applied to devices assigned to the profile. Changes made to these configurations are automatically inherited by the assigned devices. Therefore, the central benefit of a profile is its ability to update devices collectively without having to modify individual device configurations.

Default profiles are system maintained and are automatically applied to service platforms and wireless controllers. The default AP profile is automatically applied to a AP (discovered by a wireless controller or service platform) unless an AP auto provisioning policy is defined specifically assigning the AP to a user-defined profile. After adoption, changes made to a profile’s parameters are reflected across all devices using the profile. Default profiles are ideal for single site deployments where service platforms, wireless controllers, and access points share a common configuration.

User-defined profiles, on the other hand, are manually created for each supported service platform, wireless controller, and access point model. The use of user-defined profiles is recommended in larger deployments when groups of devices (on different floors, buildings or sites) share a common configuration. These user-defined profiles can be manually or automatically assigned to access points using an AP auto provisioning policy. An AP auto provisioning policy provides the means to assign profiles to access points based on model, serial number, VLAN ID, DHCP options, IP address (subnet) and MAC address. For more information, see Chapter 9, AUTO-PROVISIONING-POLICY.

A user defined profile can be created for each of the following device type:

- AP621 – Adds an AP621 access point profile
- AP622 – Adds an AP622 access point profile
- AP650 – Adds an AP650 access point profile
- AP6511 – Adds an AP6511 access point profile
- AP6521 – Adds an AP6521 access point profile
- AP6522 – Adds an AP6522 access point profile
- AP6532 – Adds an AP6532 access point profile
- AP6562 – Adds an AP6562 access point profile
- AP71XX – Adds an AP71XX access point profile supporting the AP7131, AP7161, and AP7181 models
- AP7502 – Adds an AP7502 access point profile
• AP7522 – Adds an AP7522 access point profile
• AP7532 – Adds an AP7532 access point profile
• AP7562 – Adds an AP7562 access point profile
• AP81XX – Adds an AP81XX access point profile supporting the AP8122, AP8132, and AP8163 models
• AP82XX – Adds an AP82XX access point profile supporting the AP8222 and AP8232 models
• AP8432 – Adds an AP8432 access point profile
• AP8533 – Adds an AP8533 access point profile
• EX3524 – Adds an EX3524 wireless controller profile
• EX3548 – Adds an EX3548 wireless controller profile
• RFS4000 – Adds an RFS4000 wireless controller profile
• RFS6000 – Adds an RFS6000 wireless controller profile
• RFS7000 – Adds an RFS7000 wireless controller profile
• NX45XX – Adds an NX45XX series service platform profile supporting the NX4500 and NX4524 models
• NX5500 – Adds an NX5500 wireless controller profile
• NX65XX – Adds an NX65XX series service platform profile supporting the NX6500 and NX6524 models
• NX7500 – Adds an NX75XX series service platform profile supporting the NX7510, NX7520, and NX7530 models
• NX9XXX – Adds an NX9XXX series service platform profile supporting the NX9000, NX9500, and NX9510 models
• NX9600 – Adds an NX9600 service platform profile. Supported only on a NX9600 model device.
• T5 – Adds a T5 controller profile
• vx9000 – Adds a VX9000 profile

NOTE: A T5 profile can be created only on the following platforms: RFS4000, RFS6000, RFS7000, NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, and NX9510.

NOTE: A VX9000 profile can be created only on the NX9000 series service platforms.

Although profiles assign a common set of configuration parameters across devices, individual devices can still be assigned unique configuration parameters that follow the flat configuration model. As individual device updates are made, these devices no longer share the profile based configuration they originally supported. Therefore, changes made to a profile are not automatically inherited by devices who have had their configuration customized. These devices require careful administration, as they cannot be tracked as profile members. Their customized configurations overwrite their profile configurations until the profile is re-applied.

NOTE: The commands present under ‘Profiles’ are also available under the ‘Device mode’. The additional commands specific to the ‘Device mode’ are listed separately.

This chapter is organized into the following topics:

• Profile Config Commands
• Device Config Commands
• T5 Profile Config Commands
• EX3524 & EX3548 Profile/Device Config Commands
To view the list of device profiles supported, use the following command:

```
<DEVICE>(config)#profile ?
```

```
anyap       Any access point profile
ap621       AP621 access point profile
ap622       AP622 access point profile
ap650       AP650 access point profile
ap6511      AP6511 access point profile
ap6521      AP6521 access point profile
ap6522      AP6522 access point profile
ap6532      AP6532 access point profile
ap6562      AP6562 access point profile
ap71xx      AP71XX access point profile
ap7502      AP7502 access point profile
ap7522      AP7522 access point profile
ap7532      AP7532 access point profile
ap7562      AP7562 access point profile
ap81xx      AP81XX access point profile
ap822x      AP82XX access point profile
ap8432      AP8432 access point profile
ap8533      AP8533 access point profile
containing  Specify profiles that contain a sub-string in the profile name
ex3524      EX3524 wireless controller profile
ex3548      EX3548 wireless controller profile
filter      Specify addition selection filter
nx45xx      NX45XX integrated services platform profile
nx5500      NX5500 wireless controller profile
nx65xx      NX65XX integrated services platform profile
nx75xx      NX75XX wireless controller profile
nx9000      NX9000 wireless controller profile
nx9601      NX9600 wireless controller profile
rfs4000     RFS4000 wireless controller profile
rfs6000     RFS6000 wireless controller profile
rfs7000     RFS7000 wireless controller profile
t5          T5 wireless controller profile
vx9000      VX9000 wireless controller profile
```

```
<rfs7000-37FABE(config)#profile rfs7000 default-rfs7000
rfs7000-37FABE(config-profile-default-rfs7000)#
```

```
<rfs7000-37FABE(config)#profile ap71xx default-ap71xx
rfs7000-37FABE(config-profile-default-ap71xx)#
```

```
<DEVICE>(config)#profile <DEVICE-TYPE> <PROFILE-NAME>
<DEVICE>(config-profile-<PROFILE-NAME>)#?
```

Profile Mode commands:
```
adopter-auto-provisioning-policy-lookup  Use centralized auto-provisioning policy when adopted by another controller
adoption                                 Adoption configuration
alias                                    Alias
application-policy                       Application Policy configuration
area                                     Set name of area where the system is located
arp                                      Address Resolution Protocol (ARP)
auto-learn                               Auto learning
autogen-uniqueid                         Autogenerate a unique id
autoinstall                              Autoinstall settings
bridge                                   Ethernet bridge
captive-portal                           Captive portal
cdp                                       Cisco Discovery Protocol
cluster                                   Cluster configuration
configuration-persistence                Enable persistence of configuration across reloads (startup config file)
controller                                WLAN controller configuration
critical-resource  Critical Resources
crypto  Encryption related commands
database  Database command
device-upgrade  Device firmware upgrade
dot1x  802.1X
dpi  Enable Deep-Packet-Inspection (Application Assurance)
dscp-mapping  Configure IP DSCP to 802.1p priority mapping for untagged frames
email-notification  Email notification configuration
enforce-version  Check the firmware versions of devices before interoperating
environmental-sensor  Environmental Sensors Configuration
events  System event messages
export  Export a file
file-sync  File sync between controller and adoptees
floor  Set the floor within a area where the system is located
gre  GRE protocol
guest-manager-server  Configure Guest-Manager server
http-analyze  Specify HTTP-Analysis configuration
interface  Select an interface to configure
ip  Internet Protocol (IP)
ipv6  Internet Protocol version 6 (IPv6)
l2tpv3  L2tpv3 protocol
l3e-lite-table  L3e lite Table
led  Turn LEDs on/off on the device
led-timeout  Configure the time for the led to turn off after the last radio state change
legacy-auto-downgrade  Enable device firmware to auto downgrade when other legacy devices are detected
legacy-auto-update  Auto upgrade of legacy devices
lldp  Link Layer Discovery Protocol
load-balancing  Configure load balancing parameter
logging  Modify message logging facilities
mac-address-table  MAC Address Table
mac-auth  802.1X
management-server  Configure management server address
memory-profile  Memory profile to be used on the device
meshpoint-device  Configure meshpoint device parameters
meshpoint-monitor-interval  Configure meshpoint monitoring interval
min-misconfiguration-recovery-time  Check controller connectivity after configuration is received
mint  MiNT protocol
misconfiguration-recovery-time  Check controller connectivity after configuration is received
neighbor-inactivity-timeout  Configure neighbor inactivity timeout
neighbor-info-interval  Configure neighbor information exchange interval
no  Negate a command or set its defaults
noc  Configure the noc related setting
nsight  NSight
ntp  Ntp server A.B.C.D
offline-duration  Set duration for which a device remains unadopted before it generates offline event
power-config  Configure power mode
preferred-controller-group  Controller group this system will prefer for adoption
preferred-tunnel-controller  Tunnel Controller Name this system will prefer for tunneling extended
radius vlan traffic Configure device-level radius authentication parameters
raid RAID
remove-override Remove configuration item override from the device (so profile value takes effect)
rf-domain-manager RF Domain Manager
router Dynamic routing
slot PCI expansion Slot
spanning-tree Spanning tree
traffic-class-mapping Configure IPv6 traffic class to 802.1p priority mapping for untagged frames
traffic-shape Traffic shaping
trustpoint Assign a trustpoint to a service
tunnel-controller Tunnel Controller group this controller belongs to
use Set setting to use
vrrp VRRP configuration
vrrp-state-check Publish interface via OSPF/BGP only if the interface VRRP state is not BACKUP
wep-shared-key-auth Enable support for 802.11 WEP shared key authentication
clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
di End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

<DEVICE>(config-profile-<PROFILE-NAME>)#

<DEVICE>(config-profile-<T5-PROFILE-NAME>)#?
T5 Profile Mode commands:
cpe T5 CPE configuration
interface Select an interface to configure
ip Internet Protocol (IP)
no Negate a command or set its defaults
ntp Configure NTP
override-wlan Configure RF Domain level overrides for wlan
t5 T5 configuration
t5-logging Modify message logging facilities
use Set setting to use
clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
di End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

<DEVICE>(config-profile-<T5-PROFILE-NAME>)#
EX3500 Profile Mode commands:
interface Select an interface to configure
ip Internet Protocol (IP)
no Negate a command or set its defaults
power Ex3500 Power over Ethernet Command
upgrade Configures upgrade option for ex3500 system
use Set setting to use

clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
dervert End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
show Service Commands
write Write running system information

NOTE: The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
### 7.1 Profile Config Commands

The following table summarizes profile configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>adopter-auto-provisioning-policy-lookup</code></td>
<td>Enables the use of a centralized auto provisioning policy on this profile</td>
<td>page 7-11</td>
</tr>
<tr>
<td><code>adoption</code></td>
<td>Configures a minimum and maximum delay time in the initiation of the device adoption process</td>
<td>page 7-12</td>
</tr>
<tr>
<td><code>alias</code></td>
<td>Configures network, network-group, network-service, VLAN, and string aliases on this profile</td>
<td>page 7-13</td>
</tr>
<tr>
<td><code>application-policy</code></td>
<td>Associates a RADIUS server provided application policy with this profile. When associated, the application policy allows wireless clients (MUs) to always find the RADIUS-supplied application policy in the dataplane.</td>
<td>page 7-19</td>
</tr>
<tr>
<td><code>area</code></td>
<td>Sets the system’s area of location (the area name)</td>
<td>page 7-20</td>
</tr>
<tr>
<td><code>arp</code></td>
<td>Configures static address resolution protocol</td>
<td>page 7-21</td>
</tr>
<tr>
<td><code>auto-learn</code></td>
<td>Enables controllers or service platforms to maintain a local configuration record of devices requesting adoption and provisioning. The command also enables learning of a device’s host name via DHCP options.</td>
<td>page 7-23</td>
</tr>
<tr>
<td><code>autogen-uniqueid</code></td>
<td>Autogenerates a unique local ID for devices using this profile. When executed in the device configuration mode, this command generates a unique ID for the logged device.</td>
<td>page 7-24</td>
</tr>
<tr>
<td><code>autoinstall</code></td>
<td>Configures the automatic install feature</td>
<td>page 7-26</td>
</tr>
<tr>
<td><code>bridge</code></td>
<td>Configures bridge specific parameters</td>
<td>page 7-27</td>
</tr>
<tr>
<td><code>captive-portal</code></td>
<td>Configures captive portal advanced Web page upload on a device profile</td>
<td>page 7-53</td>
</tr>
<tr>
<td><code>cdp</code></td>
<td>Enables Cisco Discovery Protocol (CDP) on a device</td>
<td>page 7-54</td>
</tr>
<tr>
<td><code>cluster</code></td>
<td>Configures a cluster name</td>
<td>page 7-55</td>
</tr>
<tr>
<td><code>configuration-persistence</code></td>
<td>Enables persistence of configuration across reloads</td>
<td>page 7-58</td>
</tr>
<tr>
<td><code>controller</code></td>
<td>Configures a wireless controller or service platform</td>
<td>page 7-59</td>
</tr>
<tr>
<td><code>critical-resource</code></td>
<td>Monitors resources that are critical to the health of the service platform, wireless controller, or access point managed network. These critical resources are identified by their configured IP addresses.</td>
<td>page 7-63</td>
</tr>
<tr>
<td><code>crypto</code></td>
<td>Configures data encryption related protocols and settings</td>
<td>page 7-71</td>
</tr>
<tr>
<td><code>database</code></td>
<td>Backs up captive-portal and/or NSight database to a specified location and file and configures a low-disk-space threshold value</td>
<td>page 7-133</td>
</tr>
<tr>
<td><code>device-upgrade</code></td>
<td>Configures device firmware upgrade settings on this profile</td>
<td>page 7-134</td>
</tr>
<tr>
<td><code>dot1x</code></td>
<td>Configures 802.1x standard authentication controls</td>
<td>page 7-136</td>
</tr>
<tr>
<td><strong>Command</strong></td>
<td><strong>Description</strong></td>
<td><strong>Reference</strong></td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>dpi</td>
<td>Enables Deep Packet Inspection (DPI) on this profile</td>
<td>page 7-138</td>
</tr>
<tr>
<td>dscp-mapping</td>
<td>Configures an IP DSCP to 802.1p priority mapping for untagged frames</td>
<td>page 7-140</td>
</tr>
<tr>
<td>email-notification</td>
<td>Configures e-mail notification settings</td>
<td>page 7-141</td>
</tr>
<tr>
<td>enforce-version</td>
<td>Enables checking of a device's firmware version before attempting adoption or clustering</td>
<td>page 7-143</td>
</tr>
<tr>
<td>environmental-sensor</td>
<td>Configures the environmental sensor settings on this profile (applicable to AP8132 model access point only)</td>
<td>page 7-144</td>
</tr>
<tr>
<td>events</td>
<td>Enables system event logging and message generation. This command also configures event message forwarding settings.</td>
<td>page 7-146</td>
</tr>
<tr>
<td>export</td>
<td>Enables export of startup.log file after every boot</td>
<td>page 7-147</td>
</tr>
<tr>
<td>file-sync</td>
<td>Configures parameters enabling synching of PKCS#12 certificate between the staging-controller and adoptee AP6522/AP6562 client bridges</td>
<td>page 7-148</td>
</tr>
<tr>
<td>floor</td>
<td>Sets the floor name where the system is located</td>
<td>page 7-149</td>
</tr>
<tr>
<td>gre</td>
<td>Enables Generic Routing Encapsulation (GRE) tunneling on this profile</td>
<td>page 7-150</td>
</tr>
<tr>
<td>guest-manager-server</td>
<td>Configures the guest management server host</td>
<td>page 7-162</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Configures HTTP analysis settings</td>
<td>page 7-163</td>
</tr>
<tr>
<td>http-analyze (NX45XX, NX65XX, and NX9000)</td>
<td>Configures HTTP analysis settings on a NX series service platform</td>
<td>page 7-165</td>
</tr>
<tr>
<td>interface</td>
<td>Configures an interface (VLAN, radio, GE, etc.)</td>
<td>page 7-168</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IPv4 components</td>
<td>page 7-355</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures IPv6 components</td>
<td>page 7-365</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>Defines the Layer 2 Tunnel Protocol (L2TP) protocol for tunneling layer 2 payloads using Virtual Private Networks (VPNs)</td>
<td>page 7-369</td>
</tr>
<tr>
<td>l3e-lite-table</td>
<td>Configures L3e Lite Table with this profile</td>
<td>page 7-371</td>
</tr>
<tr>
<td>led</td>
<td>Turns device LEDs on or off</td>
<td>page 7-372</td>
</tr>
<tr>
<td>led-timeout</td>
<td>Configures LED-timeout timer. This command is specific to the NX9000 series service platforms.</td>
<td>page 7-373</td>
</tr>
<tr>
<td>legacy-auto-downgrade</td>
<td>Auto downgrades a legacy device firmware</td>
<td>page 7-375</td>
</tr>
<tr>
<td>legacy-auto-update</td>
<td>Auto upgrades a legacy device firmware</td>
<td>page 7-376</td>
</tr>
<tr>
<td>lldp</td>
<td>Configures Link Layer Discovery Protocol (LLDP)</td>
<td>page 7-377</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>load-balancing</td>
<td>Configures load balancing parameters</td>
<td>page 7-379</td>
</tr>
<tr>
<td>logging</td>
<td>Modifies message logging settings</td>
<td>page 7-384</td>
</tr>
<tr>
<td>mac-address-table</td>
<td>Configures the MAC address table</td>
<td>page 7-386</td>
</tr>
<tr>
<td>mac-auth</td>
<td>Enables 802.1x user authentication protocol on this profile</td>
<td>page 7-388</td>
</tr>
<tr>
<td>management-server</td>
<td>Configures a management server with this profile</td>
<td>page 7-391</td>
</tr>
<tr>
<td>memory-profile</td>
<td>Configures the memory profile used on the device</td>
<td>page 7-392</td>
</tr>
<tr>
<td>meshpoint-device</td>
<td>Configures a meshpoint device parameters</td>
<td>page 7-393</td>
</tr>
<tr>
<td>meshpoint-monitor-interval</td>
<td>Configures meshpoint monitoring interval</td>
<td>page 7-394</td>
</tr>
<tr>
<td>min-misconfiguration-recovery-time</td>
<td>Configures the minimum device connectivity verification time</td>
<td>page 7-395</td>
</tr>
<tr>
<td>mint</td>
<td>Configures MiNT protocol settings</td>
<td>page 7-396</td>
</tr>
<tr>
<td>misconfiguration-recovery-time</td>
<td>Verifies device connectivity after a configuration is received</td>
<td>page 7-403</td>
</tr>
<tr>
<td>neighbor-inactivity-timeout</td>
<td>Configures neighbor inactivity timeout</td>
<td>page 7-404</td>
</tr>
<tr>
<td>neighbor-info-interval</td>
<td>Configures neighbor information exchange interval</td>
<td>page 7-405</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts settings to their default. The no command, when used in the profile configuration mode, removes the selected profile's settings or reverts them to their default.</td>
<td>page 7-406</td>
</tr>
<tr>
<td>noc</td>
<td>Configures NOC settings</td>
<td>page 7-408</td>
</tr>
<tr>
<td>nsight</td>
<td>Configures NSight database related parameters</td>
<td>page 7-409</td>
</tr>
<tr>
<td>ntp</td>
<td>Configures NTP server settings</td>
<td>page 7-414</td>
</tr>
<tr>
<td>offline-duration</td>
<td>Sets the duration, in minutes, for which a device remains unadopted before it generates offline event</td>
<td>page 7-417</td>
</tr>
<tr>
<td>power-config</td>
<td>Configures the power mode</td>
<td>page 7-418</td>
</tr>
<tr>
<td>preferred-controller-group</td>
<td>Specifies the wireless controller or service platform group preferred for adoption</td>
<td>page 7-420</td>
</tr>
<tr>
<td>preferred-tunnel-controller</td>
<td>Configures the tunnel wireless controller or service platform preferred by the system to tunnel extended VLAN traffic</td>
<td>page 7-421</td>
</tr>
<tr>
<td>radius</td>
<td>Configures device-level RADIUS authentication parameters</td>
<td>page 7-422</td>
</tr>
</tbody>
</table>
Table 7.1 Profile Config Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>raid</td>
<td>Enables alarm on the array. This command is supported only on the NX9500 and NX9510 series service platform profile/device config modes.</td>
<td>page 7-496</td>
</tr>
<tr>
<td>rf-domain-manager</td>
<td>Enables devices using this profile to be elected as RF Domain manager. Also sets the priority value for devices using this profile in the RF Domain manager election process.</td>
<td>page 7-423</td>
</tr>
<tr>
<td>router</td>
<td>Configures dynamic router protocol settings</td>
<td>page 7-424</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Configures spanning tree related settings</td>
<td>page 7-426</td>
</tr>
<tr>
<td>traffic-class-mapping</td>
<td>Maps the IPv6 traffic class value of incoming IPv6 untagged packets to 802.1p priority</td>
<td>page 7-429</td>
</tr>
<tr>
<td>traffic-shape</td>
<td>Enables traffic shaping and configures traffic shaping parameters</td>
<td>page 7-431</td>
</tr>
<tr>
<td>trustpoint (profile-config-mode)</td>
<td>Configures the trustpoint assigned for validating a CMP auth Operator</td>
<td>page 7-436</td>
</tr>
<tr>
<td>tunnel-controller</td>
<td>Configures the name of tunneled WLAN (extended VLAN) wireless controller or service platform</td>
<td>page 7-438</td>
</tr>
<tr>
<td>use</td>
<td>Uses pre configured policies with this profile</td>
<td>page 7-439</td>
</tr>
<tr>
<td>vrrp</td>
<td>Configures Virtual Router Redundancy Protocol (VRRP) group settings</td>
<td>page 7-445</td>
</tr>
<tr>
<td>vrrp-state-check</td>
<td>Publishes interface via OSPF or BGP based on VRRP status</td>
<td>page 7-449</td>
</tr>
<tr>
<td>wep-shared-key-auth</td>
<td>Enables support for 802.11 WEP shared key authentication</td>
<td>page 7-450</td>
</tr>
<tr>
<td>service</td>
<td>Service commands are used to view and manage configurations. The service commands and their corresponding parameters vary from mode to mode</td>
<td>page 7-451</td>
</tr>
<tr>
<td>slot</td>
<td>Assigns a physical slot for running Team-Centro VM on this profile/device.</td>
<td>page 7-457</td>
</tr>
</tbody>
</table>

NOTE: For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
7.1.1 adopter-auto-provisioning-policy-lookup

Profile Config Commands

Enables the use of a centralized auto provisioning policy on this profile or device. This option is applicable in an hierarchically managed (HM) network. When enabled, the auto-provisioning policy applied on the NOC gets precedence over the one applied at the site controller level. Optionally, use the ‘evaluate-always’ option to set flag to run centralized auto-provisioning policy every time a device (access point/controller) is adopted. The device’s previous adoption status is not taken into consideration.

When applied on devices adopted by a controller, this profile allows the devices to use a centralized auto provisioning policy.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7552, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

adopter-auto-provisioning-policy-lookup {evaluate-always}

Parameters

- adopter-auto-provisioning-policy-lookup {evaluate-always}

Enables the use of a centralized auto provisioning policy on this profile or device

• evaluate-always – Optional. Sets flag to run centralized auto-provisioning policy every time a device (access point/controller) is adopted.

Examples

rfs7000-6DDC4B(config-profile-default-rfs7000)#adopter-auto-provisioning-policy-lookup evaluate-always
rfs7000-6DDC4B(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
autoinstall configuration
autoinstall firmware
crypto ikev1 policy ikev1-default
isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ikev2 policy ikev2-default
isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
crypto ikev1 remote-vpn
crypto ikev2 remote-vpn
crypto auto-ipsec-secure
crypto remote-vpn-client
interface me1
interface ge1
interface ge2
interface ge3
interface ge4
interface pppoe1
use firewall-policy default
service pm sys-restart
adopter-auto-provisioning-policy-lookup evaluate-always
router ospf
rfs7000-6DDC4B(config-profile-default-rfs7000)#

Related Commands

no

Disables the application of centralized auto provisioning policy on this profile or device
### 7.1.2 adoption

#### Profile Config Commands

Configures a minimum and maximum delay time in the initiation of the device adoption process. When configured, devices do not attempt adoption immediately on coming up. The process is initiated after the lapse of a specified period of time (configured using this command as the `start-delay minimum` time).

Once configured and applied, this setting is applicable on all devices using this profile. This option is also available in the device-configuration mode.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
adoption start-delay min <0-30> max <0-30>
```

#### Parameters

- `adoption start-delay min <0-30> max <0-30>`

<table>
<thead>
<tr>
<th>adoption start-delay min &lt;0-30&gt; max &lt;0-30&gt;</th>
<th>Delays start of device adoption process</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• min &lt;0-30&gt; – Configures the minimum time to lapse before a device attempts adoption. Specify a value from 0 - 30 seconds. A device, on coming up, attempts adoption only after the lapse of the time specified here. The default is 5 seconds.</td>
</tr>
<tr>
<td></td>
<td>• max &lt;0-30&gt; – Configures the maximum time to lapse before a device attempts adoption. Specify a value from 0 - 30 seconds. The default is 20 seconds.</td>
</tr>
</tbody>
</table>

#### Examples

```
rfs7000-6DCD4B(config-profile-default-rfs7000)#adoption start-delay min 10 max 30
rfs7000-6DCD4B(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  autoinstall configuration
  autoinstall firmware
  crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  ..........................................................
  interface ge2
  interface ge3
  interface ge4
  interface pppoe1
  use firewall-policy default
  service pm sys-restart
  adopter-auto-provisioning-policy-lookup evaluate-always
  router ospf
  adoption start-delay min 10 max 30
rfs7000-6DCD4B(config-profile-default-rfs7000)#
```

#### Related Commands

`no` Removes the configured minimum start-delay value. When removed, devices attempt adoption immediately on coming up.
### 7.1.3 alias

**Profile Config Commands**

Configures network, VLAN, and service aliases. The aliases defined on this profile applies to all devices using this profile. Aliases can be also defined at the device level.

**NOTE:** You can apply overrides to aliases at the device level. For more information on aliases, see alias. Overrides applied at the device level take precedence.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX9000, NX9500, NX9510, NX9600

#### Syntax

- `alias [address-range|host|network|network-group|network-service|number|string|vlan]`
- `alias address-range <ADDRESS-RANGE-ALIAS-NAME> <STARTING-IP> to <ENDING-IP>`
- `alias host <HOST-ALIAS-NAME> <HOST-IP>`
- `alias network <NETWORK-ALIAS-NAME> <NETWORK-ADDRESS/MASK>`
- `alias network-group <NETWORK-GROUP-ALIAS-NAME> [address-range|host|network]`
- `alias network-group <NETWORK-GROUP-ALIAS-NAME> [address-range <STARTING-IP> to <ENDING-IP>] [host <HOST-IP>] [<HOST-IP>]
- `network <NETWORK-ADDRESS/MASK> [<NETWORK-ADDRESS/MASK>]`
- `alias number <NUMBER-ALIAS-NAME> <0-4294967295>`
- `alias string <STRING-ALIAS-NAME> <LINE>`
- `alias vlan <VLAN-ALIAS-NAME> <1-4094>`

#### Parameters

- `address-range <ADDRESS-RANGE-ALIAS-NAME>`

  Creates a new address-range alias for this profile. Or associates an existing address-range alias with this profile. An address-range alias maps a name to a range of IP addresses. Use this option to create unique address-range aliases for different deployment scenarios. For example, if an ACL defines a pool of network addresses as 192.168.10.10 through 192.168.10.100 for an entire network, and a remote location’s network range is 172.16.13.20 through 172.16.13.110, the remote location’s ACL can be overridden using an alias. At the remote location, the ACL works with the 172.16.13.20-110 address range. A new ACL need not be created specifically for the remote deployment location.

  - `<ADDRESS-RANGE-ALIAS-NAME>` — Specify the address range alias name.

  **Note:** Alias name should begin with ‘$’. 
**host <HOST-ALIAS-NAME>**

Creates a new host alias for this profile. Or associates an existing host alias with this profile. A host alias configuration is for a particular host device’s IP address. Use this option to create unique host aliases for different deployment scenarios. For example, if a central network DNS server is set a static IP address, and a remote location’s local DNS server is defined, this host can be overridden at the remote location. At the remote location, the network is functional with a local DNS server, but uses the name set at the central network. A new host need not be created at the remote location. This simplifies creating and managing hosts and allows an administrator to better manage specific local requirements.

- `<HOST-ALIAS-NAME>` – Specify the host alias name.

  Note: Alias name should begin with `$`.

**<HOST-IP>**

Associates the network host’s IP address with this host alias

- `<HOST-IP>` – Specify the network host’s IP address.

  Note: If using an existing host alias, you can apply overrides to the alias at the profile level.

**network <NETWORK-ALIAS-NAME>**

Creates a new network alias for this profile. Or associates an existing network alias with this profile. A network alias configuration is utilized for an IP address on a particular network. Use this option to create unique Network aliases for different deployment scenarios. For example, if a central network ACL defines a network as 192.168.10.0/24, and a remote location’s network range is 172.16.10.0/24, the ACL can be overridden at the remote location to suit their local (but remote) requirement. At the remote location, the ACL functions with the 172.16.10.0/24 network. A new ACL need not be created specifically for the remote deployment. This simplifies ACL definition and allows an administrator to better manage specific local requirements.

- `<NETWORK-ALIAS-NAME>` – Specify the network alias name.

  Note: Alias name should begin with `$`.

**<NETWORK-ADDRESS/MASK>**

Associates a single network with this network alias

- `<NETWORK-ADDRESS/MASK>` – Specify the network’s address and mask.

  Note: If using an existing network alias, you can apply overrides to the alias at the profile level.
• **alias network-group** `<NETWORK-GROUP-ALIAS-NAME>` [address-range `<STARTING-IP>` to `<ENDING-IP>`] |host `<HOST-IP>`| network `<NETWORK-ADDRESS/MASK>`

**network `<NETWORK-GROUP-ALIAS-NAME>`**

 Creates a new network-group alias for this profile. Or associates an existing network-group alias with this profile.

- `<NETWORK-GROUP-ALIAS-NAME>` – Specify the network-group alias name.

**Note:** Alias name should begin with `$`.

**Note:** The network-group aliases are used in ACLs, to define the network-specific components. ACLs using aliases can be used across sites by re-defining the network-group alias elements at the device or profile level.

After specifying the name, specify the following: a range of IP addresses, host addresses, or a range of network addresses.

**Note:** If using an existing network-group alias, you can apply overrides to the alias at the profile level.

**address-range `<STARTING-IP>` to `<ENDING-IP>`**

 Associates a range of IP addresses with this network-group alias

- `<STARTING-IP>` – Specify the first IP address in the range.
- to `<ENDING-IP>` – Specify the last IP address in the range.
- `<STARTING-IP>` to `<ENDING-IP>` – Optional. Specifies more than one range of IP addresses. A maximum of eight (8) IP address ranges can be configured.

**host `<HOST-IP>`**

 Associates a single or multiple hosts with this network-group alias

- `<HOST-IP>` – Specify the hosts’ IP address.
- `<HOST-IP>` – Optional. Specifies more than one host. A maximum of eight (8) hosts can be configured.

**network `<NETWORK-ADDRESS/MASK>`**

 Associates a single or multiple networks with this network-group alias

- `<NETWORK-ADDRESS/MASK>` – Specify the network’s address and mask.
- `<NETWORK-ADDRESS/MASK>` – Optional. Specifies more than one network. A maximum of eight (8) networks can be configured.

**alias network-service `<NETWORK-SERVICE-ALIAS-NAME>` proto `<PROTOCOL>`**

• **alias network-service** `<NETWORK-SERVICE-ALIAS-NAME>` proto `

**alias network-service `<NETWORK-SERVICE-ALIAS-NAME>`**

 Creates a new network-service alias for this profile. Or associates an existing network-service alias with this profile.

- `<NETWORK-SERVICE-ALIAS-NAME>` – Specify a network-service alias name.

**Note:** Alias name should begin with `$`.

**Note:** The network-service aliases are used in ACLs, to define the service-specific components. ACLs using aliases can be used across sites by re-defining the network-service alias elements at the device or profile level.

**Note:** If using an existing network-service alias, you can apply overrides to the alias at the profile level.
Use one of the following options to associate an Internet protocol with this network-service alias:

- `<0-254>` – Identifies the protocol by its number. Specify the protocol number from 0 - 254. This is the number by which the protocol is identified in the Protocol field of the IPv4 header and the Next Header field of IPv6 header. For example, the User Datagram Protocol’s (UDP) designated number is 17.
- `<WORD>` – Identifies the protocol by its name. Specify the protocol name.
  - `gre` – Selects *Generic Routing Encapsulation* (GRE). The protocol number is 47.
  - `ospf` – Selects *Open Shortest Path First* (OSPF). The protocol number is 89.
  - `vrrp` – Selects *Virtual Router Redundancy Protocol* (VRRP). The protocol number is 112.

After specifying the protocol, you may configure a destination port for this service. These keywords are recursive and you can configure multiple protocols and associate multiple destination and source ports.

- `<1-65535>` – Optional. Configures a destination port number from 1 - 65535
- `<WORD>` – Optional. Identifies the destination port by the service name provided. For example, the *secure shell* (SSH) service uses TCP port 22.
  - `bgp` – Optional. Configures the default *Border Gateway Protocol* (BGP) services port (179)
  - `dns` – Optional. Configures the default *Domain Name System* (DNS) services port (53)
  - `ftp` – Optional. Configures the default *File Transfer Protocol* (FTP) control services port (21)
  - `ftp-data` – Optional. Configures the default FTP data services port (20)
  - `gopher` – Optional. Configures the default gopher services port (70)
  - `https` – Optional. Configures the default HTTPS services port (443)
  - `nntp` – Optional. Configures the default Newsgroup (NNTP) services port (119)
  - `ntp` – Optional. Configures the default *Network Time Protocol* (NTP) services port (123)
  - `proto` – Optional. Use this option to select another Internet protocol in addition to the one selected in the previous step.
  - `pop3` – Optional. Configures the default *Post Office Protocol* (POP3) services port (110)
  - `smtp` – Optional. Configures the default *Simple Mail Transfer Protocol* (SMTP) services port (25)
  - `sip` – Optional. Configures the default *Session Initiation Protocol* (SIP) services port (5060)
  - `sourceport` – Optional. After specifying the destination port, you may specify a single or range of source ports.
    - `<1-65535>` – Specify the source port from 1 - 65535.
    - `<WORD>` – Specify the source port range, for example 1-10.

Contd..
- **ssh** – Optional. Configures the default SSH services port (22)
- **telnet** – Optional. Configures the default Telnet services port (23)
- **tftp** – Optional. Configures the default *Trivial File Transfer Protocol* (TFTP) services port (69)
- **www** – Optional. Configures the default HTTP services port (80)

<table>
<thead>
<tr>
<th><strong>Command</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
</table>
| **alias number** `<NUMBER-ALIAS-NAME>` `<0-4294967295>` | Creates a number alias identified by the `<NUMBER-ALIAS-NAME>` keyword. Number aliases map a name to a numeric value. For example, ‘alias number `$NUMBER` 100’  
  - The number alias name is: `$NUMBER`  
  - The value assigned is: 100  
  The value referenced by alias `$NUMBER`, wherever used, is 100.  
  - `<NUMBER-ALIAS-NAME>` – Specify the number alias name.  
  - `<0-4294967295>` – Specify the number, from 0 - 4294967295, assigned to the number alias created.  
  **Note**: Alias name should begin with '$'. |
| **alias string** `<STRING-ALIAS-NAME>` `<LINE>` | Creates a new string alias for this profile. Or associates an existing string alias with this profile. String aliases map a name to an arbitrary string value. Use this option to create unique string aliases for different deployment scenarios. For example, if the main domain at a remote location is called loc1.domain.com and at another deployment location it is called loc2.domain.com, the alias can be overridden at the remote location to suit the local (but remote) requirement. At one remote location, the alias functions with the loc1.domain.com domain and at the other with the loc2.domain.com domain.  
  - `<STRING-ALIAS-NAME>` – Specify the string alias name.  
  - `<LINE>` – Specify the string value.  
  **Note**: Alias name should begin with '$'.  
  **Note**: If using an existing string alias, you can apply overrides to the alias at the RF Domain level. |
| **alias vlan** `<VLAN-ALIAS-NAME>` `<1-4094>` | Creates a new VLAN alias for this profile. Or associates an existing VLAN alias with this profile. A VLAN alias maps a name to a VLAN ID. A VLAN alias is a configuration for optimal VLAN re-use and management for local and remote deployments. Use this option to create unique VLANs aliases for different deployment scenarios. For example, if a VLAN ID is set as 10 for the central network, and the VLAN is set as 26 at a remote location, the VLAN can be overridden at the remote location using an alias. At the remote location, the network is functional with an ID of 26, but utilizes the name defined at the central local network. A new VLAN need not be created specifically at the remote location.  
  - `<VLAN-ALIAS-NAME>` – Specify the VLAN alias name.  
  **Note**: Alias name should begin with '$'.  
  `<1-4094>` Maps the VLAN alias to a VLAN ID  
  - `<1-4094>` – Specify the VLAN ID from 1 - 4094.  
  **Note**: If using an existing VLAN alias, you can apply overrides to the alias at the profile level. |
Examples

The following example shows the global aliases configured. Note the network-service alias ‘$kerberos’ settings.

```
rfs4000-229D58(config)#show context

! Configuration of RFS4000 version 5.8.4.0-008D
!
! version 2.5
!
alias network-group $TestNetGrpAlias network 192.168.13.0/24 192.168.16.0/24
alias network-group $TestNetGrpAlias address-range 192.168.13.7 to 192.168.13.16
192.168.13.20 to 192.168.13.25
!
alias network $TestNetworkAlias 192.168.13.0/24
!
alias host $TestHostAlias 192.168.13.10
!
alias address-range $TestAddRanAlias 192.168.13.10 to 192.168.13.13
!
alias network-service $NetworkServAlias proto udp
!
alias network-service $kerberos proto tcp 749 750 80 proto udp 68 sourceport 67
!
alias vlan $TestVLANAlias 1

--More--
```

The following examples show the overrides applied to the network-service alias ‘$kerberos’ at the profile level:

```
rfs4000-229D58(config-profile-TestRFS4000)#alias network-service $kerberos proto tcp 88 proto udp 80
```

The following example shows the overrides applied to the network-service alias ‘$kerberos’ at the profile level:

```
rfs4000-229D58(config-profile-TestRFS4000)#show context
profile rfs4000 TestRFS4000
no autoinstall configuration
no autoinstall firmware

.................
```

```
service pm sys-restart
router ospf
alias network-service $kerberos proto tcp 88 proto udp 80
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the use of centralized auto provisioning policy on this profile or device</td>
</tr>
</tbody>
</table>
## 7.1.4 application-policy

### Profile Config Commands

Associates a RADIUS server provided application policy with this profile. This command is also applicable to the device configuration mode. When associated, the application policy allows wireless clients (MUs) to always find the RADIUS-supplied application policy in the dataplane.

An application policy defines the actions executed on recognized HTTP (Facebook), enterprise (Webex) and peer-to-peer (gaming) applications or application-categories. The following are the actions that can be applied in an application policy:

- **Allow** - Allows packets for a specific application and its defined category type (for e.g., social networking)
- **Deny** - Denies (restricts) packets to a specific application and its defined category type
- **Mark** - Marks recognized packets with DSCP/8021p value
- **Rate-limit** - Rate limits packets from specific application type

For more information on configuring an application policy, see `application-policy`.

### Syntax

```
application-policy radius <APP-POLICY-NAME>
```

### Parameters

- `application-policy radius <APP-POLICY-NAME>`

### Examples

```
nx9500-6C8809(config)#show context include-factory | include application-policy
application-policy Bing
no use application-policy

nx9500-6C8809(config-profile-testNX9000)#application-policy radius Bing

nx9500-6C8809(config-profile-testNX9000)#show context include-factory | include application-policy
application-policy Bing
app-category streaming
use url-list Bing
```

### Related Commands

- **no** Removes the RADIUS-server provided application policy associated with this profile
### 7.1.5 area

**Profile Config Commands**

Sets the system's area of location (the physical area of deployment)

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`area <WORD>`

**Parameters**

- `<WORD>`

**Examples**

```
area Ecospace
```

```
set context profile rfs7000 default-rfs7000
  bridge vlan 1
  ip igmp snooping
  ip igmp snooping querier
  area Ecospace
  autoinstall configuration
  autoinstall firmware
  crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ikev2 policy ikev2-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
  crypto ikev1 remote-vpn
  crypto ikev2 remote-vpn
  crypto auto-ipsec-secure
  interface me1
  interface ge1
  --More--
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets the configured area name</td>
</tr>
</tbody>
</table>
7.1.6 arp

Profile Config Commands

Adds a static Address Resolution Protocol (ARP) IP address in the ARP cache

The ARP protocol maps an IP address to a hardware MAC address recognized on the network. ARP provides protocol rules for making this correlation and providing address conversion in both directions.

When an incoming packet destined for a host arrives, ARP finds a physical host or MAC address that matches the IP address. ARP looks in its ARP cache and, if it finds the address, provides it so the packet can be converted to the right packet length, formatted, and sent to its destination. If no entry is found for the IP address, ARP broadcasts a request packet in a special format on the LAN to locate a device that recognizes the IP address. A device that recognizes the IP address as its own returns a reply indicating it. ARP updates the ARP cache for future reference and then sends the packet to the MAC address that replied.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

arp [IP|timeout]

arp <IP> <MAC> arpa [<L3-INTERFACE-NAME> | pppoe1 | vlan <1-4094> | wwan1 | serial <1-4> <1-1> <1-1>]

Parameters

- arp <IP> <MAC> arpa [<L3-INTERFACE-NAME> | pppoe1 | vlan <1-4094> | wwan1 | serial <1-4> <1-1> <1-1>]
  dhcp-server | router

- arp timeout <15-86400>

**Parameters**

- arp <IP> <MAC> arpa [<L3-INTERFACE-NAME> | pppoe1 | vlan <1-4094> | wwan1 | serial <1-4> <1-1> <1-1>]

**Table:**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>arp &lt;IP&gt;</td>
<td>Adds a static ARP IPv4 address in the ARP cache</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>- Specify the static IP address.</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Specify the MAC address associated with the IP and the Switch Virtual Interface (SVI).</td>
</tr>
<tr>
<td>arpa</td>
<td>Sets ARP encapsulation type to ARPA</td>
</tr>
<tr>
<td>&lt;L3-INTERFACE-NAME&gt;</td>
<td>Configures static ARP entry for a specified router interface</td>
</tr>
<tr>
<td>pppoe1</td>
<td>Configures static ARP entry for PPP over Ethernet interface</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Configures static ARP entry for a VLAN interface</td>
</tr>
<tr>
<td>wwan1</td>
<td>Configures static ARP entry for Wireless WAN interface</td>
</tr>
<tr>
<td>serial &lt;1-4&gt;</td>
<td>Configures the static ARP entry for serial interface</td>
</tr>
<tr>
<td>&lt;1-1&gt;</td>
<td>- Specify the Slot ID</td>
</tr>
<tr>
<td>&lt;1-1&gt;</td>
<td>- Specify the port ID</td>
</tr>
<tr>
<td>&lt;1-1&gt;</td>
<td>- Specify the Channel group ID.</td>
</tr>
<tr>
<td></td>
<td>The serial interface is applicable for the NX45XX and NX65XX series service platforms only.</td>
</tr>
</tbody>
</table>
arp timeout <15-86400>

Sets ARP entry timeout
• <TIME> – Sets the ARP entry timeout in seconds. Specify a value from 15 - 86400 seconds. The default is 3600 seconds.

Examples
rfs7000-37FABE(config-profile-default-rfs7000)#arp timeout 2000

rfs7000-37FABE(config-profile-default-rfs7000)#show context profile rfs7000 default-rfs7000
bridge vlan 1
  bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier
  arp timeout 2000
  crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ikev2 policy ikev2-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
  crypto ikev1 remote-vpn
  crypto ikev2 remote-vpn
  crypto auto-ipsec-secure
  interface me1
  interface ge1
    ip dhcp trust
  qos trust dscp
  qos trust 802.1p
  interface ge2
    ip dhcp trust
  --More--
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

no
  Removes an entry from the ARP cache
### 7.1.7 auto-learn

#### Profile Config Commands

Enables controllers or service platforms to maintain a local configuration record of devices requesting adoption and provisioning. The command also enables learning of a device’s host name via DHCP options.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
auto-learn [host-name-via-dhcp <WORD>|staging-config]
```

#### Parameters

- auto-learn [host-name-via-dhcp <WORD>|staging-config]

#### Example

```
x9500-6C8809(config-profile-test)#auto-learn staging-config
```

#### Related Commands

- **no**

  Disables automatic recognition of devices’ hostname and devices pending adoption
7.1.8 autogen-uniqueid

Profile Config Commands

Autogenerates a unique ID for devices using this profile. When executed in the device configuration mode, this command generates a unique ID for the logged device.

A device’s unique ID is a combination of a user-defined string (prefix, suffix, or both) and a substitution token. The WiNG implementation provides two built-in substitution tokens: $SN and $MiNT-ID that represent the device’s serial number and MiNT-ID respectively. The value referenced by these substitution tokens are internally retrieved and combined with the user-defined string to auto generate a unique identity for the device.

The general format of this command is: <PREFIX><SUBSTITUTION-TOKEN><SUFFIX>. You can provide both (prefix and suffix) or just a prefix or suffix.

For example, given the following set of inputs:
- user-defined prefix – TestAP6522
- substitution token – $SN
The unique ID is generated using TestAP6522$SN, where $SN is replaced with the device’s serial number.

When executed on an AP6522 (having serial number B4C7996C8809), the autogen-uniqueid TestAP6522$SN command generates the unique ID: TestAP6522B4C7996C8809. When configured on an AP6522 profile, all AP6522s using the profile autogenerate a unique ID in which the device’s serial number is preceded by the string ‘TestAP6522’.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

autogen-uniqueid <WORD>

Parameters

- autogen-uniqueid <WORD>

| autogen-uniqueid <WORD> | Autogenerates a device’s unique ID (not exceeding 64 characters in length) The ID generated is a combination of the text provided and the value referenced through the substitution token $SN or $MiNT-ID. Where ever the autogen-uniqueid is used the device’s serial number OR MiNT-ID is referenced depending on the substitution token used.
- <WORD> – Specify a auto generate unique ID format using one of the following substitution tokens: $SN - references SERIAL NUMBER of the device $MiNT-ID - references MiNT-ID of the device
For example, Test-$SN-TechPubs. In this example ‘Test’ and ‘TechPubs’ represent the user-defined prefix and suffix respectively. And $SN is the substitution token. |
Examples

```
nx4500-5CFA2B(config-profile-testAP6522)#autogen-uniqueid TestAP6522$SN

nx4500-5CFA2B(config-profile-testAP6522)#show context
profile ap621 testAP621
  autogen-uniqueid TestAP6522$SN
  no autoinstall configuration
  no autoinstall firmware
  interface radio1
  interface ge1
  use firewall-policy default
  service pm sys-restart

nx4500-5CFA2B(config-profile-testAP6522)#

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B)#autogen-uniqueid Test-$MiNT-ID-TechPubs

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B)#show context
nx45xx B4-C7-99-5C-FA-2B
  use profile default-nx45xx
  use rf-domain default
  hostname nx4500-5CFA2B
  license AP DEFAULT-12AP-LICENSE
  license ADSEC DEFAULT-ADV-SEC-LICENSE
  environmental-sensor temperature
  autogen-uniqueid Test-$MiNT-ID-TechPubs
  ip default-gateway 192.168.13.2
  interface up1
    no shutdown
    switchport mode access
  switchport access vlan 1
  interface vlan1
    ip address 192.168.13.12/24
    logging on
    logging console warnings
    logging buffered warnings

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>When executed in the device configuration mode, removes the device's autogen-uniqueid. When executed in the profile configuration mode, removes the autogen-uniqueid on all devices using the profile.</td>
</tr>
</tbody>
</table>
## 7.1.9 autoinstall

### Profile Config Commands

Automatically installs firmware image and startup configuration parameters on to the selected device.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

```
autoinstall [configuration|firmware|start-interval <WORD>]
```

### Parameters

- `autoinstall [configuration|firmware|start-interval <WORD>]`

<table>
<thead>
<tr>
<th>configuration</th>
<th>Autoinstalls startup configuration. Setup parameters are automatically configured on devices using this profile. This option is disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>firmware</td>
<td>Autoinstalls firmware image. Firmware images are automatically installed on devices using this profile. This option is disabled by default.</td>
</tr>
<tr>
<td>start-interval &lt;WORD&gt;</td>
<td>Configures the interval between system boot and start of autoinstall process (this is the time, from system boot, after which autoinstall should start)</td>
</tr>
<tr>
<td></td>
<td>• &lt;WORD&gt; – Specify the interval in minutes. The default is 10. <strong>Note:</strong> Zero (0) implies firmware or startup configuration installation can start any time.</td>
</tr>
</tbody>
</table>

### Examples

```
rfs7000-37FABE(config-profile-default-rfs7000)#autoinstall configuration
rfs7000-37FABE(config-profile-default-rfs7000)#autoinstall firmware
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
bridge vlan 1
    bridging-mode isolated-tunnel
    ip igmp snooping
    ip igmp snooping querier
    arp timeout 2000
autoinstall configuration
autoinstall firmware
crypto ikev1 policy ikev1-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ikev2 policy ikev2-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
crypto ikev1 remote- vpn
crypto ikev2 remote- vpn
crypto auto- ipsec- secure
interface mel
interface gel
    ip dhcp trust
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#
```

### Related Commands

- `no` Disables the auto install settings
7.1.10 bridge

Profile Config Commands

The following table summarizes Ethernet bridge configuration commands:

**Table 7.2 Ethernet Bridge Config Mode Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>bridge</td>
<td>Enables Ethernet bridge configuration context</td>
<td>page 7-28</td>
</tr>
<tr>
<td>bridge-vlan-mode</td>
<td>Summarizes bridge VLAN configuration mode commands</td>
<td>page 7-31</td>
</tr>
</tbody>
</table>
7.1.10.1 bridge

bridge

Configures VLAN Ethernet bridging parameters. Use this command to configure a Bridge NAT or Bridge VLAN settings.

Configuring bridge Network Address Translation (NAT) parameters, allows management of Internet traffic originating at a remote site. In addition to traditional NAT functionality, bridge NAT provides a means of configuring NAT for bridged traffic through an access point. NAT rules are applied to bridged traffic through the access point, and matching packets are NATed to the WAN link instead of being bridged on their way to the router. Using bridge NAT, a tunneled VLAN (extended VLAN) is created between the NOC and a remote location. When a remote client needs to access the Internet, Internet traffic is routed to the NOC, and from there routed to the Internet. This increases the access time for the end user on the client. To resolve latency issues, bridge NAT identifies and segregates traffic heading towards the NOC and outwards towards the Internet. Traffic towards the NOC is allowed over the secure tunnel. Traffic towards the Internet is switched to a local WLAN link with access to the Internet.

A Virtual LAN (VLAN) is a separately administrated virtual network within the same physical managed network. VLANs are broadcast domains defined within wireless controllers or service platforms to allow control of broadcast, multicast, unicast, and unknown unicast within a layer 2 device. For example, say several computers are used in conference room X and some in conference Y. The systems in conference room X can communicate with one another, but not with the systems in conference room Y. The VLAN enables the systems in conference rooms X and Y to communicate with one another even though they are on separate physical subnets. The systems in conference rooms X and Y are managed by the same single wireless controller or service platform, but ignore the systems that are not using the same VLAN ID. Administrators often need to route traffic between different VLANs. Bridging VLANs are only for non-routable traffic, like tagged VLAN frames destined to some other device, which will untag it. When a data frame is received on a port, the VLAN bridge determines the associated VLAN based on the port of reception. Using forwarding database information, the bridge VLAN forwards the data frame on the appropriate port(s). VLANs are useful to set separate networks to isolate some computers from others, without actually having to have separate cabling and Ethernet switches. Controllers can do this on their own, without need for the computer or other gear to know itself what VLAN it is on (this is called port-based VLAN, since it is assigned by port of the switch). Another common use is to put specialized devices like VoIP Phones on a separate network for easier configuration, administration, security, or quality of service.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Switch Note: For more information on the interface types and the devices supporting them, see interface.

Syntax

bridge [nat|vlan]

bridge nat source list <IP-ACCESS-LIST-NAME> precedence <1-500> interface
    [<<LAYER3-INTERFACE-NAME>>|pppoe1|vlan <1-4094>|wwan1] [(address|interface|overload|
    pool <NAT-POOL-NAME>)]

bridge vlan [<1-4094>|<VLAN-ALIAS-NAME>]


Parameters

- **bridge nat source list** `<IP-ACCESS-LIST-NAME>` precedence `<1-500>` interface
  
  `<[<LAYER3-INTERFACE-NAME>|pppoe1|vlan <1-4094>|wwan1] [(address|interface|overload|pool <NAT-POOL-NAME>)]>

<table>
<thead>
<tr>
<th>nat</th>
<th>Configures bridge NAT parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>source</td>
<td>Configures NAT source addresses</td>
</tr>
<tr>
<td>list</td>
<td>Associates an access control list (ACL) with this bridge NAT policy. The ACL specifies the IP address permit/deny rules applicable to this bridge NAT policy.</td>
</tr>
<tr>
<td><code>&lt;IP-ACCESS-LIST-NAME&gt;</code></td>
<td>Specify access list name.</td>
</tr>
<tr>
<td>precedence <code>&lt;1-500&gt;</code></td>
<td>Specifies a precedence value for this bridge NAT policy.</td>
</tr>
<tr>
<td>interface</td>
<td>Selects one of the following as the primary interface (between the source and destination points):</td>
</tr>
<tr>
<td>`&lt;[&lt;LAYER3-INTERFACE-NAME&gt;</td>
<td>pppoe1</td>
</tr>
<tr>
<td></td>
<td>pppoe1 – A PPP over Ethernet interface.</td>
</tr>
<tr>
<td></td>
<td>vlan <code>&lt;1-4094&gt;</code> – A VLAN interface. Specify the VLAN interface index from 1 - 4094.</td>
</tr>
<tr>
<td></td>
<td>wwan1 – A Wireless WAN interface.</td>
</tr>
<tr>
<td>`[[(address</td>
<td>interface</td>
</tr>
<tr>
<td></td>
<td>address – Configures the interface IP address used for NAT</td>
</tr>
<tr>
<td></td>
<td>interface – Configures the failover interface (default setting)</td>
</tr>
<tr>
<td></td>
<td>overload – Enables use of one global address for multiple local addresses (terminates command)</td>
</tr>
<tr>
<td></td>
<td>pool <code>&lt;NAT-POOLNAME&gt;</code> – Configures the NAT pool used with this bridge NAT policy. Specify the NAT pool name. For more information on configuring a NAT pool, see <code>nat-pool-config-instance</code>.</td>
</tr>
<tr>
<td><code>vlan &lt;1-4094&gt;</code></td>
<td>Configures the numerical identifier for the Bridge VLAN when it was initially created.</td>
</tr>
<tr>
<td><code>vlan &lt;VLAN-ALIAS-NAME&gt;</code></td>
<td>Configures the VLAN alias (should be existing and configured) identifying the bridge VLAN</td>
</tr>
</tbody>
</table>

Usage Guidelines

Creating customized filter schemes for bridged networks limits the amount of unnecessary traffic processed and distributed by the bridging equipment.

If a bridge does not hear *Bridge Protocol Data Units* (BPDUs) from the root bridge within the specified interval, defined in the max-age (seconds) parameter, assume the network has changed and recomputed the spanning-tree topology.
Examples

rfs7000-37FABE(config-profile-default-rfs7000)#bridge vlan 1
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#?

Bridge VLAN Mode commands:

- bridging-mode: Configure how packets on this VLAN are bridged
- captive-portal: Captive Portal
- description: Vlan description
- edge-vlan: Enable edge-VLAN mode
- firewall: Enable vlan firewall (IPv4)
- http-analyze: Forward URL and Data to controller
- ip: Internet Protocol (IP)
- ipv6: Internet Protocol version 6 (IPv6)
- l2-tunnel-broadcast-optimization: Enable broadcast optimization
- no: Negate a command or set its defaults
- stateful-packet-inspection-l2: Enable stateful packet inspection in layer2 firewall
- tunnel: Vlan tunneling settings
- tunnel-over-level2: Tunnel extended VLAN traffic over level 2 MiNT links
- use: Set setting to use
- clrscr: Clears the display screen
- commit: Commit all changes made in this session
- do: Run commands from Exec mode
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
- help: Description of the interactive help system
- revert: Revert changes
- service: Service Commands
- show: Show running system information
- write: Write running configuration to memory or terminal

rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#
### 7.1.10.2 bridge-vlan-mode commands

#### bridge

The following table summarizes bridge VLAN configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>bridging-mode</td>
<td>Configures how packets on this VLAN are bridged</td>
<td>page 7-32</td>
</tr>
<tr>
<td>captive-portal</td>
<td>Enables IP packet snooping on wired captive portals, and also configures the subnet to snoop</td>
<td>page 7-33</td>
</tr>
<tr>
<td>description</td>
<td>Configures VLAN bridge description</td>
<td>page 7-34</td>
</tr>
<tr>
<td>edge-vlan</td>
<td>Enables edge VLAN mode</td>
<td>page 7-35</td>
</tr>
<tr>
<td>firewall</td>
<td>Enables firewall on this bridge VLAN interface</td>
<td>page 7-36</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Enables the analysis of URLs and data traffic on this Bridge VLAN</td>
<td>page 7-37</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IP components</td>
<td>page 7-38</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures IPv6 components</td>
<td>page 7-41</td>
</tr>
<tr>
<td>l2-tunnel-broadcast-optimization</td>
<td>Enables broadcast optimization</td>
<td>page 7-44</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 7-45</td>
</tr>
<tr>
<td>stateful-packet-inspection-l2</td>
<td>Enables statedly packet inspection in the layer 2 fire wall</td>
<td>page 7-47</td>
</tr>
<tr>
<td>tunnel</td>
<td>Enables tunneling of unicast messages to unknown MAC destinations, on the selected VLAN bridge</td>
<td>page 7-48</td>
</tr>
<tr>
<td>tunnel-over-level2</td>
<td>Enables extended VLAN traffic over level 2 MiNT links</td>
<td>page 7-50</td>
</tr>
<tr>
<td>use</td>
<td>Associates a captive-portal, access control list (IP, IPv6, or MAC), and a URL filter with this bridge VLAN</td>
<td>page 7-51</td>
</tr>
</tbody>
</table>
7.1.10.2.1 bridging-mode

*bridge-vlan-mode commands*

Configures how packets are bridged on the selected VLAN

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

bridging-mode [auto|isolated-tunnel|local|tunnel]

**Parameters**

- bridging-mode [auto|isolated-tunnel|local|tunnel]

<table>
<thead>
<tr>
<th>bridging-mode</th>
<th>Configures the VLAN bridging mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>auto</td>
<td>Automatically selects the bridging mode to match the WLAN, VLAN and bridging mode configurations. When selected, the controller or access point determines the best bridging mode for the VLAN. (default setting)</td>
</tr>
<tr>
<td>isolated-tunnel</td>
<td>Bridges packets between local Ethernet ports and local radios, and passes tunneled packets through without de-tunneling. Select this option for a dedicated tunnel for bridging VLAN traffic.</td>
</tr>
<tr>
<td>local</td>
<td>Bridges packets normally between local Ethernet ports and local radios (if any). Local mode is typically configured in remote branch offices where traffic on remote private LAN segments need to be bridged locally. Local mode implies that traffic, wired and wireless, is to be bridged locally.</td>
</tr>
<tr>
<td>tunnel</td>
<td>Bridges packets between local Ethernet ports, local radios, and tunnels to other APs, wireless controllers, or service platforms. Select this option to use a shared tunnel for bridging VLAN traffic. In tunnel mode, the traffic at the AP is always forwarded through the best path. The APs decide the best path to reach the destination and forward packets accordingly. Setting the VLAN to tunnel mode ensures packets are bridged between local Ethernet ports, any local radios, and tunnels to other APs, wireless controllers, and service platforms.</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

ACLs can only be used with tunnel or isolated-tunnel modes. They do not work with the local and automatic modes.

**Examples**

rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#bridging-mode isolated-tunnel

rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#show context
bridge vlan 1
  bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#

**Related Commands**

| no | Resets bridging mode to auto |
7.1.10.2.2 captive-portal

*bridge-vlan-mode commands*

Enables IP packet snooping on wired captive portals, and also configures the subnet to snoop. When enabled, IP packets received from wired captive portal clients, on the specified subnet, are snooped to learn IP to MAC mapping.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controller
- Access Points — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
captive-portal [ipv4-snooping|ipv6-snooping] subnet <IPv4/M|IPv6/M> {excluded-address <IPv4|IPv6>}
```

**Parameters**

- **captive-portal [ipv4-snooping|ipv6-snooping] subnet <IPv4/M|IPv6/M> {excluded-address <IPv4|IPv6>}

| captive-portal [ipv4-snooping|ipv6-snooping] | Enables snooping of IPv4 or IPv6 packets (based on the option selected) for wired captive portal clients |
| subnet <IPv4/M|IPv6/M> | Enables IPv4 or IPv6 packet snooping on a specified subnet |
| • <IPv4/M|IPv6/M> – Specify the subnet address in the A.B.C.D/M or X:X::X:X/M format to identify an IPv4 or IPv6 subnet respectively. When specified, this is the IPv4/IPv6 subnet on which IP packets are to be snooped. |
| excluded-address <IPv4|IPv6> | Optional. Configures the IPv4 or IPv6 address excluded from snooping within the specified IPv4/IPv6 subnet. |
| • <IPv4|IPv6> – Specify the IPv4 or IPv6 address. Use this parameter to configure the gateway’s address. |

**Examples**

```
nx9500-6C8809(config-profile NX9000Test-bridge-vlan-4)#captive-portal ip-snooping subnet 192.168.13.0/24 excluded-address 192.168.13.7
```

```
nx9500-6C8809(config-profile NX9000Test-bridge-vlan-4)#show context bridge vlan 4 captive-portal ip-snooping subnet 192.168.13.0/24 excluded-address 192.168.13.7 ip igmp snooping ip igmp snooping querier ipv6 mld snooping ipv6 mld snooping querier
```

**Related Commands**

| no | Disables IP packet snooping on wired captive portals |
7.1.10.2.3 **description**

*bridge-vlan-mode commands*

Configures VLAN bridge description.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

description <WORD>

**Parameters**

- description <WORD>

<table>
<thead>
<tr>
<th>description &lt;WORD&gt;</th>
<th>Configures a description for this VLAN bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;WORD&gt; – Enter a description. The description should be unique to the VLAN's specific configuration to help differentiate it from other VLANs with similar configurations.</td>
</tr>
</tbody>
</table>

**Examples**

```
rf7000-37FABE(config-profile default-rf7000-bridge-vlan-1)#description "This is a description for the bridged VLAN"

rf7000-37FABE(config-profile default-rf7000-bridge-vlan-1)#show context
bridge vlan 1
description "This is a description for the bridged VLAN"
bridging-mode isolated-tunnel
ip igmp snooping
ip igmp snooping querier
```

**Related Commands**

- **no** Removes VLAN bridge description
7.1.10.2.4 edge-vlan

*b*ridge-vlan-mode commands

Enables the edge VLAN mode. In the edge VLAN mode, a protected port does not forward traffic to another protected port on the same wireless controller or service platform. This feature is enabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

dedge-vlan

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#edge-vlan
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the edge VLAN mode</td>
</tr>
</tbody>
</table>
7.1.10.2.5 firewall

Enables IPv4 firewall on this bridge VLAN interface. This feature is enabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
firewall
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#firewall
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables firewall on this bridge VLAN interface</td>
</tr>
</tbody>
</table>
7.1.10.2.6 http-analyze

*bridge-vlan-mode commands*

Enables the analysis of URLs and data traffic on this Bridge VLAN. When enabled, URLs and data are forwarded to the controller running the HTTP analytics engine.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
http-analyze {filter [images|post|query-string]}
```

**Parameters**

- `http-analyze {filter [images|post|query-string]}`

| http-analyze filter [images|post] query-string | Enables URL and HTTP data analysis. Optionally use the filter keyword to filter out specific URLs
|-------------------------------------------------|--------------------------------------------------------------|
|                                                 | • filter – Optional. Filters out specific URLs
|                                                 | • images – Filters out URLs referring to images
|                                                 | • post – Filters out URLs referring to POSTs
|                                                 | • query-string – Filters out query strings received from URLs

**Examples**

```plaintext
rfs4000-229D58(config-device 00-23-68-22-9D-58-bridge-vlan-4)#http-analyze filter images
```

```plaintext
rfs4000-229D58(config-device 00-23-68-22-9D-58-bridge-vlan-4)#show context bridge vlan 4
http-analyze filter images
```

**Related Commands**

| `no` | Disables forwarding of URLs and data to the controller running the HTTP analytics engine |
7.1.10.2.7 ip

*bridge-vlan-mode commands*

Configures VLAN bridge IP components

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
ip [arp|dhcp|igmp]
ip [arp|dhcp] trust
ip igmp snooping {fast-leave|forward-unknown-multicast|last-member-query-count|mrouter|querier}
ip igmp snooping {fast-leave|forward-unknown-multicast|last-member-query-count <1-7>}
ip igmp snooping {mrouter [interface|learn]}
ip igmp snooping {mrouter [interface <INTERFACE-LIST>|learn pim-dvmrp]}
ip igmp snooping {querier} {address|max-response-time|timer|version}
ip igmp snooping {querier} {address <IP>|max-response-time <1-25>|timer expiry <60-300>|version <1-3>}
```

Parameters

- **ip [arp|dhcp] trust**
  - Configures the VLAN bridge IP parameters
  - arp trust
    - Configures the ARP trust parameter. Trusted ARP packets are used to update the DHCP snoop table to prevent IP spoof and arp-cache poisoning attacks. This option is disabled by default.
    - trust – Trusts ARP responses on the VLAN bridge
  - dhcp trust
    - Configures the DHCP trust parameter. Uses DHCP packets, from a DHCP server, as trusted and permissible within the access point, wireless controller, or service platform managed network. DHCP packets are used to update the DHCP snoop table to prevent IP spoof attacks. This feature is enabled by default.
    - trust – Trusts DHCP responses on the VLAN bridge

- **ip igmp snooping {fast-leave|forward-unknown-multicast|last-member-query-count <1-7>}**
  - Configures the VLAN bridge IP parameters
  - igmp snooping
    - Configures Internet Group Management Protocol (IGMP) snooping parameters. IGMP snooping is enabled by default.
    - IGMP establishes and maintains multicast group memberships for interested members. Multicasting allows a networked device to listen to IGMP network traffic and forward IGMP multicast packets to radios on which the interested hosts are connected. The device also maintains a map of the links that require multicast streams, there by reducing unnecessary flooding of the network with multicast traffic.
### Fast-Leave

Optional. Enables fast leave processing. When enabled, layer 2 LAN interfaces are removed from the IGMP snooping forwarding table entry without initially sending IGMP group-specific queries to the interface. When receiving a group specific IGMPv2 leave message, IGMP snooping removes the interface from the Layer 2 forwarding table entry for that multicast group, unless a multicast router was learned on the port. Fast-leave processing enhances bandwidth management for all hosts on the network. This option is disabled by default.

**Note:** This feature is supported only on the AP7502, AP82XX, AP8533 model access points.

### Forward Unknown Multicast

Optional. Enables forwarding of multicast packets from unregistered multicast groups. If disabled, the unknown multicast forward feature is also disabled for individual VLANs. This option is enabled by default.

### Last Member Query Count

Optional. Configures the last member query count used in determining the number of group-specific queries sent before removing the snoop entry

- `<1-7>` – Specify the count from 1 - 7. The default value is 2.

### IP IGMP Snooping

#### {mrouter [interface <INTERFACE-LIST>|learn pim-dvmrp]}

**ip**

Configures the VLAN bridge IP parameters

**igmp snooping**

Configures the IGMP snooping parameters

**mrouter**

Optional. Configures the multicast router parameters

**interface <INTERFACE-LIST>**

Configures the multicast router interfaces. This option is disabled by default.

- `<INTERFACE-LIST>` – Specify a comma-separated list of interface names.

**learn pim-dvmrp**

Configures the multicast router learning protocols. This option is disabled by default.

- `pim-dvmrp` – Enables *Protocol-Independent Multicast (PIM)* and *Distance-Vector Multicast Routing Protocol (DVMRP)* snooping of packets

### IP IGMP Snooping

#### {querier} {address <IP>|max-response-time <1-25>|timer expiry <60-300>|version <1-3>}

**ip**

Configures the VLAN bridge IP parameters

**igmp snooping**

Configures the IGMP snooping parameters

**querier**

Optional. Configures the IGMP querier parameters. This option is disabled by default. Enables IGMP querier. IGMP snoop querier keeps host memberships alive. It is primarily used in a network where there is a multicast streaming server and hosts subscribed to the server and no IGMP querier present. The access point, wireless controller, or service platform performs the IGMP querier role. An IGMP querier sends out periodic IGMP query packets. Interested hosts reply with an IGMP report packet. IGMP snooping is only conducted on wireless radios. IGMP multicast packets are flooded on wired ports. IGMP multicast packet are not flooded on the wired port. IGMP membership is also learnt on it and only if present, then it is forwarded on that port.

- `address <IP>` – Specify the IGMP querier source IP address.
- `max-response-time <1-25>`
- `timer expiry <60-300>`
- `version <1-3>`
max-response-time <1-25> | Optional. Configures the IGMP querier maximum response time. This option is disabled by default.
| • <1-25> – Specify the maximum response time from 1 - 25 seconds.

The access point, wireless controller, or service platform forwards multicast packets only to radios present in the snooping table. IGMP reports from wired ports are forwarded to the multicast router ports.

If no reports are received from a radio, it is removed from the snooping table. The radio then stops receiving multicast packets.

timer expiry <60-300> | Optional. Configures the IGMP querier expiry time. The value specified is used as the timeout interval for other querier resources. This option is disabled by default.
| • expiry – Configures the IGMP querier timeout
| • <60-300> – Specify the IGMP querier timeout from 60 - 300 seconds.

version <1-3> | Optional. Configures the IGMP version. This option is disabled by default.
| • <1-3> – Specify the IGMP version. The versions are 1-3.

Examples
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#ip arp trust
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#ip dhcp trust
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#ip igmp snooping mrouter interface ge1 ge2
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#ip igmp snooping mrouter learn pim-dvmrp
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#ip igmp snooping querier max-response-time 24
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#ip igmp snooping querier timer expiry 100
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#ip igmp snooping querier version 2
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#show context bridge vlan 1
description "This is a description for the bridged VLAN"
  ip arp trust
  ip dhcp trust
  ip igmp snooping
  ip igmp snooping querier
  ip igmp snooping querier version 2
  ip igmp snooping querier max-response-time 24
  ip igmp snooping querier timer expiry 100
  ip igmp snooping mrouter interface ge1 ge2
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#

Related Commands
no | Disables or reverts the VLAN Ethernet bridge parameters
7.1.10.2.8 ipv6

**bridge-vlan-mode commands**

Configures this VLAN bridge’s IPv6 components

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

ipv6 [dhcpv6|firewall|mld|nd]

ipv6 dhcpv6 trust

ipv6 firewall

ipv6 mld snooping {forward-unknown-multicast|mrouter|querier}

ipv6 mld snooping {forward-unknown-multicast}

ipv6 mld snooping {mrouter [interface|learn]}

ipv6 mld snooping {mrouter [interface <INTERFACE-LIST>|learn pim-dvmrp]}

ipv6 mld snooping {querier} {max-response-time|timer|version}

ipv6 mld snooping { querier } { max-response-time <1-25000> | timer expiry <60-300> | version <1-2> }

ipv6 nd raguard

**Parameters**
- ipv6 dhcpv6 trust
  
  **ipv6 dhcpv6 trust**
  
  Configures the VLAN bridge IPv6 parameters

  Enables the DHCPv6 trust option. When enabled all DHCPv6 responses are trusted on this bridge VLAN. This option is enabled by default.
  
  - trust – Trusts DHCPv6 responses on this bridge VLAN

- ipv6 firewall

  **ipv6 firewall**

  Configures the VLAN bridge IPv6 parameters

  Enables IPv6 firewall on this bridge VLAN. This option is enabled by default.

  Devices utilizing IPv6 addressing require firewall protection unique to IPv6 traffic. IPv6 addresses are composed of eight groups of four hexadecimal digits separated by colons. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the neighbor discovery (ND) protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters. Routers respond to such a request with a router advertisement (RA) packet that contains Internet layer configuration parameters.
ipv6 mld snooping \{forward-unknown-multicast\}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipv6</td>
<td>Configures the VLAN bridge IPv6 parameters</td>
</tr>
<tr>
<td>mld snooping</td>
<td>Configures Multicast Listener Discovery Protocol (MLD) snooping parameters. MLD snooping enables a access point, wireless controller, or service platform to examine MLD packets and make forwarding decisions based on the content. MLD is used by IPv6 devices to discover devices wanting to receive multicast packets destined for specific multicast addresses. MLD uses multicast listener queries and multicast listener reports to identify which multicast addresses have listeners and join multicast groups. MLD snooping caps the flooding of IPv6 multicast traffic on controller, service platform or access point VLANs. When enabled, MLD messages between hosts and multicast routers are examined to identify the hosts receiving multicast group traffic. The access point, wireless controller, or service platform forward multicast traffic only to those interfaces connected to interested receivers instead of flooding traffic to all interfaces. This option is enabled by default.</td>
</tr>
<tr>
<td>forward-unknown-multicast</td>
<td>Optional. Enables forwarding of multicast packets from unregistered multicast groups. If disabled, the unknown multicast forward feature is also disabled for individual VLANs. This option is enabled by default.</td>
</tr>
</tbody>
</table>

ipv6 mld snooping \{mrouter [interface <INTERFACE-LIST>|learn pim-dvmrp]\}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipv6</td>
<td>Configures the VLAN bridge IPv6 parameters</td>
</tr>
<tr>
<td>mld snooping</td>
<td>Configures MLD snooping parameters. This option is enabled by default.</td>
</tr>
<tr>
<td>mrouter</td>
<td>Optional. Configures the multicast router parameters, such as interfaces and learning protocol used.</td>
</tr>
<tr>
<td>interface &lt;INTERFACE-LIST&gt;</td>
<td>Configures the multicast router interfaces. This option is disabled by default.</td>
</tr>
<tr>
<td></td>
<td>• &lt;INTERFACE-LIST&gt; – Specify a comma-separated list of interface names.</td>
</tr>
<tr>
<td>learn pim-dvmrp</td>
<td>Configures the multicast router learning protocols. This option is disabled by default.</td>
</tr>
<tr>
<td></td>
<td>• pim-dvmrp – Enables PIM and DVMRP snooping of packets</td>
</tr>
</tbody>
</table>

ipv6 mld snooping \{querier\} \{max-response-time <1-25000>|timer expiry <60-300>|version <1-2}\}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipv6</td>
<td>Configures the VLAN bridge IPv6 parameters</td>
</tr>
<tr>
<td>mld snooping</td>
<td>Configures IPv6 MLD snooping parameters. This option is disabled by default.</td>
</tr>
<tr>
<td>querier</td>
<td>Optional. Enables and configures the MLD querier parameters. When enabled, the device (access point, wireless controller, and service platform) sends query messages to discover which network devices are members of a given multicast group. This option is disabled by default.</td>
</tr>
<tr>
<td>max-response-time &lt;1-25000&gt;</td>
<td>Optional. Configures the IPv6 MLD querier’s maximum response time. This option is disabled by default.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-25000&gt; – Specify the maximum response time from 1 - 25000 milliseconds.</td>
</tr>
<tr>
<td>timer expiry &lt;60-300&gt;</td>
<td>Optional. Configures the IPv6 MLD other querier’s timeout. This option is disabled by default.</td>
</tr>
<tr>
<td></td>
<td>• &lt;60-300&gt; – Specify the MLD other querier’s timeout from 60 - 300 seconds.</td>
</tr>
</tbody>
</table>
### Examples

rfs7000-37FABE(config-profile test-bridge-vlan-2)#ipv6 dhcapv6 trust
rfs7000-37FABE(config-profile test-bridge-vlan-2)#ipv6 firewall
rfs7000-37FABE(config-profile test-bridge-vlan-2)#ipv6 mld snooping forward-unknown-multicast
rfs7000-37FABE(config-profile test-bridge-vlan-2)#ipv6 mld snooping mrouter interface ge1 ge2
rfs7000-37FABE(config-profile test-bridge-vlan-2)#ipv6 mld snooping mrouter learn pim-dvmrp
rfs7000-37FABE(config-profile test-bridge-vlan-2)#ipv6 mld snooping querier max-response-time 20000
rfs7000-37FABE(config-profile test-bridge-vlan-2)#ipv6 mld snooping querier timer expiry 200
rfs7000-37FABE(config-profile test-bridge-vlan-2)#ipv6 mld snooping querier version 2
rfs7000-37FABE(config-profile test-bridge-vlan-2)#show context bridge vlan 2
  ip igmp snooping
  ip igmp snooping querier
  ipv6 mld snooping
  ipv6 mld snooping mrouter interface ge1 ge2
  ipv6 mld snooping querier max-response-time 20000
  ipv6 mld snooping querier timer expiry 200
rfs7000-37FABE(config-profile test-bridge-vlan-2)#

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables or reverts the VLAN Ethernet bridge IPv6 parameters</td>
</tr>
</tbody>
</table>
### 7.1.10.2.9 l2-tunnel-broadcast-optimization

#### bridge-vlan-mode commands

Enables broadcast optimization on this bridge VLAN. Enabling this feature aids in the identification of each incoming packet. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
l2-tunnel-broadcast-optimization
```

#### Parameters

None

#### Examples

```
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#l2-tunnel-broadcast-optimization
```
```
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#show context bridge vlan 1
description "This is a description for the bridged VLAN"
l2-tunnel-broadcast-optimization
bridging-mode isolated-tunnel
ip arp trust
ip dhcp trust
ip igmp snooping
ip igmp snooping querier
ip igmp snooping mrouter interface ge2 ge1
ip igmp snooping querier version 2
ip igmp snooping querier max-response-time 24
ip igmp snooping querier timer expiry 100
```
```
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#
```

#### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables broadcast optimization</td>
</tr>
</tbody>
</table>
7.1.10.2.10 no

^ **bridge-vlan-mode commands**

Negates a command or reverts settings to their default. The no command, when used in the bridge VLAN mode, negates the VLAN bridge settings or reverts them to their default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

no [bridging-mode|captive-portal|description|edge-vlan|firewall|http-analyze|ip|ipv6|
12-tunnel-broadcast-optimization|stateful-packet-inspection-12|tunnel|
tunnel-over-level2|use]

no [bridging-mode|description|edge-vlan|l2-tunnel-broadcast-optimization|
stateful-packet-inspection-12|tunnel-over-level2]

no captive-portal [ip-snooping|ipv6-snooping] subnet <IPv4/M|IPv6/M>
{excluded-address <IPv4|IPv6>}

no http-analyze {filter [images|post|query-string]}

no ip [arp|dhcp|igmp]

no ip [arp|dhcp] trust

no ip igmp snooping {fast-leave|forward-unknown-multicast|last-member-query-count|
mrouter|querier}

no ip igmp snooping {forward-unknown-multicast}

no ip igmp snooping {mrouter [interface <INTERFACE-LIST>|learn pin-dvmrp]}

no ip igmp snooping {querier} {address|max-response-time|timer expiry|version}

no ipv6 [dhcpv6|firewall|mld|nd]

no ipv6 dhcpv6 trust

no ipv6 firewall

no ipv6 mld snooping {forward-unknown-multicast}

no ipv6 mld snooping {mrouter [interface <INTERFACE-LIST>|learn pin-dvmrp]}

no ipv6 mld snooping {querier} {max-response-time|timer expiry|version}

no ipv6 nd raguard

no tunnel [rate-limit level2|unknown-unicast]

no use [application-policy|captive-portal|ip-access-list|ipv6-access-list|
mac-access-list|url-list] tunnel out

**Parameters**

- no <PARAMETERS>

no <PARAMETERS> Resets or reverts this bridge VLAN’s settings based on the parameters passed

**Examples**

The following example displays bridge VLAN 20 settings before the ‘no’ commands are executed:

nx4500-5CFA2B(config-profile default-nx45xx-bridge-vlan-20)#show context
bridge vlan 20
  ip igmp snooping
  ip igmp snooping querier
  ipv6 mld snooping
ipv6 mld snooping querier

nx4500-5CFA2B(config-profile default-nx45xx-bridge-vlan-20)#
nx4500-5CFA2B(config-profile default-nx45xx-bridge-vlan-20)#no ip igmp snooping
nx4500-5CFA2B(config-profile default-nx45xx-bridge-vlan-20)#no ipv6 mld snooping querier

The following example displays bridge VLAN 20 settings after the ‘no’ commands are executed:

nx4500-5CFA2B(config-profile default-nx45xx-bridge-vlan-20)#show context bridge vlan 20
  no ip igmp snooping
  ip igmp snooping querier
  ipv6 mld snooping
  no ipv6 mld snooping querier
nx4500-5CFA2B(config-profile default-nx45xx-bridge-vlan-20)#
7.1.10.2.11 stateful-packet-inspection-l2

*bridge-vlan-mode commands*

Enables a stateful packet inspection at the layer 2 firewall

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
stateful-packet-inspection-l2
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#stateful-packet-inspection-l2
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables stateful packet inspection at the layer 2 firewall</td>
</tr>
</tbody>
</table>
### 7.1.10.2.12 tunnel

#### bridge-vlan-mode commands

Enables tunneling of unicast messages, to unknown MAC destinations, on the selected VLAN bridge.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

tunnel [rate-limit|unknown-unicast]

tunnel rate-limit level2 rate <50-1000000> max-burst-size <2-1024>

{red-threshold [background <0-100>|best-effort <0-100>|video <0-100>|voice <0-100>]

tunnel unknown-unicast

#### Parameters

- tunnel rate-limit level2 rate <50-1000000> max-burst-size <2-1024>

{red-threshold [background <0-100>|best-effort <0-100>|video <0-100>|voice <0-100>]

<table>
<thead>
<tr>
<th>tunnel rate-limit level2 rate &lt;50-1000000&gt; max-burst-size &lt;2-1024&gt;</th>
<th>Configures a rate-limit parameters (max-burst-size and rate) for tunneled VLAN traffic over level 2 MiNT links</th>
</tr>
</thead>
<tbody>
<tr>
<td>• rate – Optional. Configures the data rate, in kilobits per second, for the incoming and outgoing extended VLAN traffic tunneled over MiNT level 2 links</td>
<td>• &lt;50-1000000&gt; – Specify a value from 50 - 1000000 Kbps. The default is 5000 Kbps.</td>
</tr>
<tr>
<td>• max-burst-size – Optional. Configures the maximum burst size</td>
<td>• &lt;2-1024&gt; – Specify the maximum burst size from 2 - 1024 kbytes. The default is 320 kbytes.</td>
</tr>
</tbody>
</table>

After specifying the max-burst-size, optionally specify the red-threshold value for the different traffic class. The red-threshold is configured as a % of the specified max-burst-size.

- red-threshold – Optional. Configures the random early detection threshold for the different traffic class

  - background – Configures the red-threshold for low priority traffic from 0 -100. The default is 50% of the specified max-burst-size.
  - best-effort – Configures the red-threshold for normal priority traffic from 0 -100. The default is 50% of the specified max-burst-size.
  - video – Configures the red-threshold for video traffic from 0 -100. The default is 25% of the specified max-burst-size.
  - voice – Configures the red-threshold for voice traffic from 0 -100. The default is 0% of the specified max-burst-size.

- tunnel unknown-unicast

| tunnel unknown-unicast | Enables tunneling of unicast packets destined for unknown MAC addresses |
**Examples**

rfs7000-37FABE(config-profile TestAP81xx-bridge-vlan-1)#tunnel unknown-unicast

rfs7000-37FABE(config-profile TestAP81xx-bridge-vlan-1)#no tunnel unknown-unicast

rfs7000-37FABE(config-profile TestAP81xx-bridge-vlan-1)#show context
  bridge vlan 1
  ip igmp snooping
  ip igmp snooping querier
  no tunnel unknown-unicast
rfs7000-37FABE(config-profile TestAP81xx-bridge-vlan-1)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables tunneling of unicast messages, to unknown MAC destinations, on the selected VLAN bridge</td>
</tr>
</tbody>
</table>
### 7.1.10.2.13 tunnel-over-level2

**Bridge-vlan-mode commands**

Enables extended VLAN (tunneled VLAN) traffic over level 2 MiNT links. This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

tunnel-over-level2

**Parameters**

None

**Examples**

```
rfs4000-229D58(config-profile testRFS4000-bridge-vlan-1)#tunnel-over-level2
rfs4000-229D58(config-profile testRFS4000-bridge-vlan-1)#show context
bridge vlan 1
description "This is a description for the bridged VLAN"
l2-tunnel-broadcast-optimization
bridging-mode isolated-tunnel
tunnel-over-level2
ip arp trust
ip dhcp trust
ip igmp snooping
ip igmp snooping querier
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables extended VLAN traffic over level 2 MiNT links</td>
</tr>
</tbody>
</table>
### 7.1.10.2.14 use

**bridge-vlan-mode commands**

Associates a captive-portal, access control list (IPv4, IPv6, or MAC), and/or a URL filter with this bridge VLAN

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

use [application-policy|captive-portal|ip-access-list|ipv6-access-list|mac-access-list|url-filter]

use application-policy <APP-POLICY-NAME>

use captive-portal <CAPTIVE-PORTAL-NAME>

use [ip-access-list|ipv6-access-list|mac-access-list] tunnel out <IP/IPv6/MAC-ACCESS-LIST-NAME>

use url-filter <URL-FILTER-NAME>

**Parameters**

- **use application-policy <APP-POLICY-NAME>**

<table>
<thead>
<tr>
<th>use application-policy &lt;APP-POLICY-NAME&gt;</th>
<th>Enforces application detection on this VLAN bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;APP-POLICY-NAME&gt; – Specify the application policy name (should be existing and configured).</td>
<td></td>
</tr>
<tr>
<td>Note: For more information on application definitions and application policies, see application and application-policy.</td>
<td></td>
</tr>
</tbody>
</table>

- **use captive-portal <CAPTIVE-PORTAL-NAME>**

<table>
<thead>
<tr>
<th>use captive-portal &lt;CAPTIVE-PORTAL-NAME&gt;</th>
<th>Applies an existing captive portal configuration to restrict access to the bridge VLAN configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;CAPTIVE-PORTAL-NAME&gt; – Specify the captive portal name.</td>
<td></td>
</tr>
</tbody>
</table>

- **use [ip-access-list|ipv6-access-list|mac-access-list] tunnel out <IP/IPv6/MAC-ACCESS-LIST-NAME>**

<table>
<thead>
<tr>
<th>use</th>
<th>Sets this VLAN bridge policy to use an IPv4/IPv6 access list or a MAC access list</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip-access-list</td>
<td>Associates a pre-configured IPv4 access list with this VLAN-bridge interface</td>
</tr>
<tr>
<td>ipv6-access-list</td>
<td>Associates a pre-configured IPv6 access list with this VLAN-bridge interface</td>
</tr>
<tr>
<td>mac-access-list</td>
<td>Associates a pre-configured MAC access list with this VLAN-bridge interface</td>
</tr>
</tbody>
</table>
### tunnel out
<IP/IPv6/MAC-ACCESS-LIST-NAME>

The following keywords are common to the 'IPv4/IPv6 access list' and 'MAC access list' parameters:
- **tunnel** – Applies IPv4/IPv6 access list or MAC access list to all packets going into the tunnel
- **out** – Applies IPv4/IPv6 access list or MAC access list to all outgoing packets
- `<IP/IPv6/MAC-ACCESS-LIST-NAME>` – Specify the IP/IPv6 access list or MAC access list name.

- **use url-filter <URL-FILTER-NAME>**

<table>
<thead>
<tr>
<th>use url-filter</th>
<th>Sets this VLAN bridge to use a URL filter</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;URL-FILTER-NAME&gt;</code></td>
<td>Specify the URL filter name. It should be existing and configured. This option enforces URL filtering on the VLAN bridge.</td>
</tr>
</tbody>
</table>

### Examples

```bash
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#use mac-access-list tunnel out PERMIT-ARP-AND-IPv4
```

```bash
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#show context bridge vlan 1
  ip igmp snooping
  ip igmp snooping querier
  use mac-access-list tunnel out PERMIT-ARP-AND-IPv4
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#
```

### Related Commands

- **no** Disables or reverts VLAN Ethernet bridge settings
7.1.11 captive-portal

_PROFILE Config Commands_

Configures captive portal advanced Web page uploads on this profile. These Web pages are uploaded to access points supporting the captive portal.

A captive portal is a means of providing guests temporary and restrictive access to the controller managed wireless network. A captive portal provides secure authenticated controller access by capturing and re-directing a wireless user's Web browser session to a captive portal login page, where the user must enter valid credentials. Once the user is authenticated and logged into the controller managed network, additional agreement, welcome, and fail pages provide the administrator with options to control the captive portal's screen flow and user appearance.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

_Syntax_

captive-portal page-upload count <1-20>

_Parameters_

- captive-portal page-upload count <1-20>

<table>
<thead>
<tr>
<th>page-upload</th>
<th>Enables captive portal advanced Web page upload</th>
</tr>
</thead>
<tbody>
<tr>
<td>count &lt;1-20&gt;</td>
<td>Sets the maximum number of APs that can be uploaded concurrently</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-20&gt; – Set a value from 1 - 20. The default is 10.</td>
</tr>
</tbody>
</table>

_Examples_

nx9500-6C8809(config-profile-testNX9000)#captive-portal page-upload count 15

nx9500-6C8809(config-profile-testNX9000)#show context include-factory | include captive-portal

_captive-portal page-upload count 15_

no captive-portal-enforcement
no captive-portal-enforcement
no captive-portal-enforcement
no captive-portal-enforcement
no captive-portal-enforcement
no captive-portal-enforcement
service captive-portal-server connections-per-ip 3

nx9500-6C8809(config-profile-testNX9000)#
7.1.12 cdp

Profile Config Commands

Enables Cisco Discovery Protocol (CDP), a proprietary data link layer network protocol implemented in Cisco networking equipment and used to share network information amongst different vendor wireless devices.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

cdp [holdtime|run|timer]
cdp [holdtime <10-1800>|run|timer <5-900>]

Parameters

- cdp [holdtime <10-1800>|run|timer <5-900>]

<table>
<thead>
<tr>
<th>holdtime &lt;10-1800&gt;</th>
<th>Specifies the holdtime after which transmitted packets are discarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10-1800&gt;</td>
<td>– Specify a value from 10 - 1800 seconds. The default is 180 seconds.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>run</th>
<th>Enables CDP sniffing and transmit globally. This feature is enabled by default.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>timer &lt;5-900&gt;</th>
<th>Specifies the interval, in seconds, between successive CDP packet transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5-900&gt;</td>
<td>– Specify a value from 5 - 900 seconds. The default is 60 seconds.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config profile-default-rfs7000)#cdp run
rfs7000-37FABE(config profile-default-rfs7000)#cdp holdtime 1000
rfs7000-37FABE(config profile-default-rfs7000)#cdp timer 900
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
  no edge-vlan
  l2-tunnel-broadcast-optimization
  ............................................................
  qos trust 802.1p
  interface pppoe1
  use firewall-policy default
  cdp holdtime 1000
  cdp timer 900
  service pm sys-restart
  router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

no | Disables CDP on this profile
### 7.1.13 cluster

**Profile Config Commands**

Sets the cluster configuration

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
cluster [force-configured-state|force-configured-state-delay|handle-stp|
master-priority|member|mode|name|radius-counter-db-sync-time]
```

```
cluster [force-configured-state|force-configured-state-delay <3-1800>|handle-stp|
master-priority <1-255>]
```

```
cluster member [ip|vlan]
cluster member [ip <IP> {level [1|2]}|vlan <1-4094>]
```

```
cluster mode [active|standby]
```

```
cluster name <CLUSTER-NAME>
```

```
cluster radius-counter-db-sync-time <1-1440>
```

**Parameters**

- **force-configured-state**
  - **force-configured-state**
    - Forces adopted APs to auto revert when a failed wireless controller or service platform (in a cluster) restarts.
    - When an active controller (wireless controller, or service platform) fails, a standby controller in the cluster takes over APs adopted by the failed active controller. If the failed active controller were to restart, it starts a timer based on the 'force-configured-state-delay' interval specified. At the expiration of this interval, the standby controller releases all adopted APs and goes back to a monitoring mode. If the active controller fails during this interval, the 'force-configured-state-delay' timer is stopped. The timer restarts as soon as the active controller comes back up.
    - This feature is disabled by default.

- **force-configured-state-delay <3-1800>**
  - Forces cluster transition to the configured state after a specified interval.
  - **<3-1800>** – Specify a delay from 3 - 1800 minutes. The default is 5 minutes.
  - This is the interval a standby controller waits before releasing adopted APs when a failed primary controller becomes active again.

- **handle-stp**
  - Enables Spanning Tree Protocol (STP) convergence handling. This feature is disabled by default.
  - In layer 2 networks, this protocol is enabled to prevent network looping. If enabled, the network forwards data only after STP convergence. Enabling STP convergence delays the redundancy state machine execution until the STP convergence is completed (the standard protocol value for STP convergence is 50 seconds). Delaying the state machine is important to load balance APs at startup.
### master-priority <1-255>
Confirms cluster master priority
- `<1-255>` – Specifies cluster master election priority. Assign a value from 1 - 255. Higher the value higher is the precedence. The default is 128.

In a cluster environment one device from the cluster is elected as the cluster master. A device’s master priority value decides the device’s priority to become cluster master.

### Examples
```
rfs7000-37FABE(config-profile-default-rfs7000)#cluster name cluster1
rfs7000-37FABE(config-profile-default-rfs7000)#cluster member ip 172.16.10.3
rfs7000-37FABE(config-profile-default-rfs7000)#cluster mode active
```

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`cluster member [ip &lt;IP&gt; {level [1</td>
<td>2]}</td>
</tr>
<tr>
<td>`ip &lt;IP&gt; level [1</td>
<td>2]`</td>
</tr>
<tr>
<td><code>vlans &lt;1-4094&gt;</code></td>
<td>Configures the cluster VLAN where members can be reached.</td>
</tr>
<tr>
<td>`mode [active</td>
<td>standby]`</td>
</tr>
<tr>
<td><code>name &lt;CLUSTER-NAME&gt;</code></td>
<td>Configures the cluster name.</td>
</tr>
<tr>
<td><code>radius-counter-db-sync-time &lt;1-1440&gt;</code></td>
<td>Configures the interval, in minutes, at which the RADIUS counter database is synchronized with the dedicated NTP server resource.</td>
</tr>
</tbody>
</table>

#### Examples
```
rfs7000-37FABE(config-profile-default-rfs7000)#cluster name cluster1
rfs7000-37FABE(config-profile-default-rfs7000)#cluster member ip 172.16.10.3
rfs7000-37FABE(config-profile-default-rfs7000)#cluster mode active
```
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
    description Vlan1

cluster name cluster1
cluster member ip 172.16.10.3
cluster member vlan 1
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes cluster member</td>
</tr>
</tbody>
</table>
7.1.14 configuration-persistence

Profile Config Commands

Enables configuration persistence across reloads. This option is enabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

configuration-persistence {auto|secure}

Parameters

- configuration-persistence {auto|secure}

| auto | Optional. Assigns default value based on the device type |
| secure | Optional. Ensures parts of a file that contain security information are not written during a reload |

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#configuration-persistence secure

rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
  no edge-vlan
  ip igmp snooping
  no ip igmp snooping unknown-multicast-fwd
  no ip igmp snooping mrouter learn pim-dvmrp
  autoinstall configuration
  autoinstall firmware
  .................................................................
  cluster name cluster1
  cluster member ip 1.2.3.4 level 2
  cluster member ip 172.16.10.3
  cluster member vlan 4094
  cluster handle-stp
  cluster force-configured-state
  holdtime 1000
  timer 900
  configuration-persistence secure
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

- no | Disables automatic write up of startup configuration file |
7.1.15 controller

Profile Config Commands

Configures the WiNG controller (wireless controller or service platform) adoption settings. Adoption is the process a controller or service platform uses to discover available access points and/or peer controllers/service platforms, establish an association and provision the adopted device. Adoption settings are configurable and supported within a profile and applied to all devices supported by the profile. Use this command to add a controller to a pool and group. This command also enables and disables adoption on controllers, and specifies the device types that can be adopted by a controller.

In an hierarchically managed (HM) network, devices (Controllers and access points) are deployed across three levels. This results in devices that are either adoptee or adopters. For more information on HM network, see device-upgrade.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

controller [adopted-devices|adoption|group|hello-interval|vlan|host]
controller adopted-devices [aps {controllers}|controllers {aps}|external-devices|external-devices-monitoring-only]
controller adoption
controller [group <CONTROLLER-GROUP-NAME>|vlan <1-4094>]
controller hello-interval <1-120> adjacency-hold-time <2-600>
controller host [<IPv4>|<IPv6>|<HOSTNAME>] {ipsec-secure|level|pool|remote-vpn-client}
controller host [<IPv4>|<IPv6>|<HOSTNAME>] {ipsec-secure} {gw [<IP>|<HOSTNAME>]}
controller host [<IPv4>|<IPv6>|<HOSTNAME>] {ipsec-secure|level [1|2]|pool <1-2> level [1|2]} {gw [<IP>|<HOSTNAME>]}
controller host [<IPv4>|<IPv6>|<HOSTNAME>] {remote-vpn-client}

Parameters

- controller adopted-devices [aps {controllers}|controllers {aps}|external-devices|external-devices-monitoring-only]

<table>
<thead>
<tr>
<th>controller</th>
<th>Configures the WLAN’s controller adoption settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>adopted-devices</td>
<td>Configures the types of device (AP/controller) this controller can adopt</td>
</tr>
<tr>
<td>aps {controllers}</td>
<td>Enables the adoption of network access points by this controller. This option is enabled by default.</td>
</tr>
<tr>
<td>controllers {aps}</td>
<td>Enables the adoption of peer controllers by this controller</td>
</tr>
</tbody>
</table>

- aps — Optional. Enables the adoption of network access points by this controller
- controllers — Optional. Enables the adoption of peer controllers by this controller

A controller cannot be configured as an adoptee and an adopter simultaneously. In other words, an adopted controller (adoptee) cannot be configured to adopt another controller. Use the no > controller > adopted-devices command to remove this setting.
### Configuration Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>external-devices</strong></td>
<td>Enables adoption of external devices by this controller. This option is disabled by default. When enabled, a WiNG controller can adopt and manage T5 controllers and EX3500 switches (using the IPX operating system) within a WiNG managed device subnet. This setting is disabled by default. To disable T5 or EX3500 adoption, use the <code>no &gt; controller &gt; external-devices</code> command. <strong>Note:</strong> This feature is supported only on RFS4000, RFS7000, NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, and NX9600 platforms.</td>
</tr>
<tr>
<td><strong>external-devices-monitoring-only</strong></td>
<td>Enables only monitoring of external devices by this controller or service platform. This option is disabled by default.</td>
</tr>
</tbody>
</table>

#### Example Configuration

**controller adoption**

```
controller adoption Enables the adoption of the logged device (wireless controller or service platform) by other controllers. This option is disabled by default.
Use the `no > controller > adoption` command to disable adoption.
```

**controller [group <CONTROLLER-GROUP-NAME>|vlan <1-4094>]**

```
controller Configures the WLAN's controller adoption settings
```

**group <CONTROLLER-GROUP-NAME>**

```
Configures the wireless controller or service platform group
- `<CONTROLLER-GROUP-NAME>` – Specify the wireless controller or service platform group name.
```

**vlan <1-4094>**

```
Configures the wireless controller or service platform VLAN
- `<1-4094>` – Specify the VLAN ID from 1 - 4094.
```

**controller hello-interval <1-120> adjacency-hold-time <2-600>**

```
controller Configures the WLAN's controller settings
```

**hello-interval <1-120>**

```
Configures the hello-interval in seconds. This is the interval between consecutive hello packets exchanged between AP and wireless controller or service platform.
- `<1-120>` – Specify a value from 1 - 120 seconds.
```

**adjacency-hold-time <2-600>**

```
Configures the adjacency hold time in seconds. This is the time since the last received hello packet, after which the adjacency between wireless controller or service platform and AP is lost, and the link is re-established.
- `<2-600>` – Specify a value from 2 - 600 seconds.
```

**controller host [<IPv4>|<IPv6>|<HOSTNAME>] {ipsec-secure} {gw [<IP>|<HOSTNAME>]}**

```
controller Configures the WLAN's controller adoption settings
```

**host [<IPv4>|<IPv6>|<HOSTNAME>]**

```
Configures wireless controller or service platform’s IPv4/IPv6 address or hostname
- `<IPv4>` – Configures wireless controller or service platform’s IPv4 address
- `<IPv6>` – Configures wireless controller or service platform’s IPv6 address
- `<HOSTNAME>` – Configures wireless controller or service platform’s hostname
```
**controller host [IPv4]|IPv6|<HOSTNAME>]**

Optional. Configures wireless controller or service platform’s IPv4/IPv6 address or name
- IPv4 – Configures wireless controller or service platform’s IPv4 address
- IPv6 – Configures wireless controller or service platform’s IPv6 address
- <HOSTNAME> – Configures wireless controller or service platform’s name

**level [1|2]**

The following keywords are common to the ‘IP’, ‘IPv6’, and ‘hostname’ parameters:
- level [1|2] – Optional. After providing the wireless controller or service platform’s address, optionally select one of the following routing levels:
  - 1 – Optional. Level 1, local routing
  - 2 – Optional. Level 2, inter-site routing
  
  **Note:** After specifying the routing level, you can, optionally enable IPSec Secure authentication and remote VPN client.

**pool <1-2> level [1|2]**

The following keywords are common to the ‘IP’, ‘IPv6’, and ‘hostname’ parameters:
- pool <1-2> – Select either 1 or 2 as the pool. The default is 1. After selecting the pool, optionally select one of the following two routing levels:
  - 1 – Optional. Level 1, local routing
  - 2 – Optional. Level 2, inter-site routing

**{ipsec-secure {gw [IP]|<HOSTNAME>]}}|remote-vpn-client**

After specifying the routing level and or device’s pool, you can optionally specify the following:
- ipsec-secure – Optional. Enables Internet Protocol Security (IPSec) peer authentication on the connection (link) between the adopting devices. This option is disabled by default.
  - gw – Optional. Specifies a IPSec gateway other than the wireless controller or service platform
    - <IP> – Use this option to specify the IPSec gateway’s IP address.
    - <HOSTNAME> – Use this option to specify the IPSec gateway’s hostname.
    
    **Note:** If the gateway’s IP address or hostname is not specified, the system assumes the logged controller as the IPSec gateway.

- remote-vpn-client – Forces MiNT link creation protocol (MLCP) to use remote VPN connection on the controller

The controller uses remote VPN tunnel for this traffic. If multiple controller hosts are configured, either all the hosts should use remote-vpn-client or none.

**Note:** When enabled, an MLCP connection is not initiated until remote VPN connection is UP and virtual IP, DNS server, source route, etc. are installed on the AP.
controller host [<IPv4>|<IPv6>|<HOSTNAME>] {remote-vpn-client}

<table>
<thead>
<tr>
<th>controller</th>
<th>Configures the WLAN’s controller settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>host [&lt;IPv4&gt;</td>
<td>&lt;IPv6&gt;</td>
</tr>
<tr>
<td>remote-vpn-client</td>
<td>Forces MLCP to use remote VPN connection on the controller</td>
</tr>
</tbody>
</table>

- `<IPv4>` – Configures wireless controller or service platform’s IPv4 address
- `<IPv6>` – Configures wireless controller or service platform’s IPv6 address
- `<HOSTNAME>` – Configures wireless controller or service platform’s name

**Examples**

```bash
rfs7000-37FABE(config-profile-default-rfs7000)#controller group test
rfs7000-37FABE(config-profile-default-rfs7000)#controller host 1.2.3.4 pool 2
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
no autoinstall configuration
crypto isakmp policy default
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
interface me1
  interface ge1
    ip dhcp trust
    qos trust dscp
    qos trust 802.1p
  interface ge4
    ip dhcp trust
    qos trust dscp
    qos trust 802.1p
use firewall-policy default
ccontroller host 1.2.3.4 pool 2
ccontroller group test
service pm sys-restart
```

```bash
rfs4000-229D58(config-profile-testRFS4000)#controller adopted-devices aps controllers
rfs4000-229D58(config-profile-testRFS4000)#show context
profile rfs4000 testRFS4000
autoinstall configuration
                          ..........................................................
logging on
service pm sys-restart
router ospf
ccontroller adopted-devices aps controllers
```

**Related Commands**

| no                        | Disables or reverts settings to their default |
7.1.16 critical-resource

Profile Config Commands

Enables monitoring of resources critical to the health of the service platform, wireless controller, or access point managed network. These critical resources are identified by their configured IP addresses. When enabled, the system monitors these devices regularly and logs their status. Use this command to create a critical resource monitoring (CRM) policy.

A critical resource can be a gateway, AAA server, WAN interface, any hardware, or a service on which the stability of the network depends. Monitoring these resources is therefore essential. When enabled, this feature pings critical resources regularly to ascertain their status. If there is a connectivity issue, an event is generated stating a critical resource is unavailable. By default, there is no enabled critical resource policy and one needs to be created and implemented.

Critical resources can be monitored directly through the interfaces on which they are discovered. For example, a critical resource on the same subnet as an AP8132 access point can be monitored by its IP address. However, a critical resource located on a VLAN must continue to be monitored on that VLAN.

Critical resource monitoring can be enabled on service platforms, wireless controllers, and access points through their respective device profiles.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

critical-resource [<CRM-POLICY-NAME>|monitor|retry-count]
critical-resource <CRM-POLICY-NAME> [monitor|monitor-using-flows]
critical-resource <CRM-POLICY-NAME> monitor [direct|via]
critical-resource <CRM-POLICY-NAME> monitor direct [all|any] [<IP>|sync-adoptees] {<IP>|arp-only vlan <1-4094> | <IP>|port [<LAYER2-IP-NAMESPACE>|ge <1-4>|port-channel <1-2>]}
critical-resource <CRM-POLICY-NAME> monitor via [<IP]|<LAYER3-INTERFACE-NAMESPACE>|pppoel|vlan|wwan1

critical-resource <CRM-POLICY-NAME> monitor via [<IP]|<LAYER3-INTERFACE-NAMESPACE>|pppoel|vlan <1-4094>|wwan1 [all|any] [<IP]|sync-adoptees {<IP>|arp-only vlan <1-4094> | <IP>|port [<LAYER2-IP-NAMESPACE>|ge <1-4>|port-channel <1-2>]}
critical-resource <CRM-POLICY-NAME> monitor-using-flows [all|any] [criteria|dhcp|dns|sync-adoptees]
{dhcp vlan <1-4094>|dns <IP/HOST-ALIAS-NAMESPACE>}
critical-resource <CRM-POLICY-NAME> monitor-using-flows [all|any] dhcp vlan <1-4094> {dhcp vlan <1-4094>|dns <IP/HOST-ALIAS-NAMESPACE>}
critical-resource <CRM-POLICY-NAME> monitor-using-flows [all|any] dns <IP/HOST-ALIAS-NAMESPACE> {dhcp vlan <1-4094>|dns <IP/HOST-ALIAS-NAMESPACE>}
critical-resource monitor interval <5-86400>
critical-resource retry-count <0-10>

Parameters
- critical-resource <CRM-POLICY-NAME> monitor direct [all|any] [<IP>|sync-adoptees] {<IP>|arp-only vlan <1-4094> {<IP>|port [<LAYER2-IF-NAME>|ge <1-4] |port-channel <1-2>}}

<table>
<thead>
<tr>
<th>&lt;CRM-POLICY-NAME&gt;</th>
<th>Creates a critical resource monitoring policy, identified by the &lt;CRM-POLICY-NAME&gt; keyword. Provide the CRM policy name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>monitor</td>
<td>Enables critical resource(s) monitoring</td>
</tr>
<tr>
<td>direct [all</td>
<td>any]</td>
</tr>
</tbody>
</table>
| [<IP>|sync-adoptees] | - all – Monitors all resources that are going down (generates an event when all specified critical resources are unreachable)  
|                    | - any – Monitors any resource that is going down (generates an event when any one of the specified critical resource is unreachable)  
|                    | - <IP> – Configures the IP address of the critical resource being monitored (for example, the DHCP or DNS server). Specify the IP address in the A.B.C.D format.  
|                    | - sync-adoptees – Syncs adopted access points with the controller. In the stand-alone AP scenario, where the CRM policy is running on the AP, the AP is directly intimated in case a critical resource goes down. On the other hand, when an AP is adopted to a controller (running the CRM policy), it is essential to enable the sync-adoptees option in order to sync the AP with the controller regarding the latest CRM status. |

<table>
<thead>
<tr>
<th>arp-onlyvlan &lt;1-4094&gt;</th>
<th>The following keywords are common to the ‘all’ and ‘any’ parameters:</th>
</tr>
</thead>
</table>
| port [<LAYER2-IF-NAME>|ge|port-channel]} | - arp-only vlan <1-4094> – Optional. Uses ARP to determine if the IP address is reachable (use this option to monitor resources that do not have IP addresses). ARP is used to resolve hardware addresses when only the network layer address is known.  
|                                | - vlan <1-4094> – Specifies the VLAN ID on which to send the probing ARP requests. Specify the VLAN ID from 1 - 4094.  
|                                | - <IP> – Optional. Limits ARP to a device specified by the <IP> parameter  
|                                | - port [<LAYER2-IF-NAME>|ge|port-channel] – Optional. Limits ARP to a specified port                      |

- critical-resource <CRM-POLICY-NAME> monitor via [<IP>|<LAYER3-INTERFACE-NAME>|pppoe1|vlan <1-4094>|wwan1] [all|any] [<IP>|sync-adoptees] {<IP>|arp-only [vlan <1-4094>] {<IP>|port [<LAYER2-IF-NAME>|ge|port-channel]}}

<table>
<thead>
<tr>
<th>&lt;CRM-POLICY-NAME&gt;</th>
<th>Creates a critical resource monitoring policy, identified by the &lt;CRM-POLICY-NAME&gt; keyword. Provide the CRM policy name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>monitor</td>
<td>Enables critical resource(s) monitoring</td>
</tr>
<tr>
<td>via</td>
<td>Specifies the interface or next-hop via which the ICMP pings should be sent. Configures the interface or next-hop via which ICMP pings are sent. This does not apply to IP addresses configured for arp-only. For interfaces which learn the default-gateway dynamically (like DHCP clients and PPP interfaces), use an interface name for VIA, or use an IP address.</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>Specify the IP address of the next-hop via which the critical resource(s) are monitored. Configures up to four IP addresses for monitoring. All the four IP addresses constitute critical resources.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;LAYER3-INTERFACE-NAME&gt;</th>
<th>Specify the layer 3 Interface name (router interface)</th>
</tr>
</thead>
<tbody>
<tr>
<td>pppoe1</td>
<td>Specifies PPP over Ethernet interface</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Specifies the wireless controller or service platform’s VLAN interface. Specify VLAN ID from 1 - 4094.</td>
</tr>
<tr>
<td>wwan1</td>
<td>Specifies Wireless WAN interface</td>
</tr>
</tbody>
</table>
| [all|any]                 | Monitors critical resources using the default routing engine
| [<IP>|sync-adoptees]       | • all – Monitors all resources that are going down (generates an event when all specified critical resource IP addresses are unreachable)
|                          | • any – Monitors any resource that is going down (generates an event when any one of the specified critical resource IP address is unreachable)
|                          | • <IP> – Configures the IP address of the critical resource being monitored (for example, the DHCP or DNS server). Specify the IP address in the A.B.C.D format.
|                          | • sync-adoptees – Syncs adopted access points with the controller. In the stand-alone AP scenario, where the CRM policy is running on the AP, the AP is directly intimated in case a critical resource goes down. On the other hand, when an AP is adopted to a controller (running the CRM policy), it is essential to enable the sync-adoptees option in order to sync the AP with the controller regarding the latest CRM status. |
| arp-only                 | The following keywords are common to the ‘all’ and ‘any’ parameters:
| vlan <1-4094>            | • arp-only vlan <1-4094> – Optional. Uses ARP to determine if the IP address is reachable (use this option to monitor resources that do not have IP addresses). ARP is used to resolve hardware addresses when only the network layer address is known.
| {<IP>|port [<LAYER2-IFNAME>|ge|port-channel]} | • vlan <1-4094> – Specifies the VLAN ID to send the probing ARP requests. Specify the VLAN ID from 1 - 4094.
|                          | • <IP> – Optional. Limits ARP to a device specified by the <IP> parameter
|                          | • port [<LAYER2-IFNAME>|ge|port-channel] – Optional. Limits ARP to a specified port |

| <CRM-POLICY-NAME>        | Creates a critical resource monitoring policy, identified by the <CRM-POLICY-NAME> keyword. Provide the CRM policy name. |
| monitor-using-flows      | Enables critical resource(s) monitoring using message flows for DHCP or DNS (DHCP discover, DHCP offer, etc.) instead of ICMP or ARP packets in order to reduce the amount of traffic on the network. |
| [all|any]                 | Configures how critical resource event messages are generated. Options include all and any.
|                          | • all – Monitors all resources that are going down (generates an event when all specified critical resources are unreachable)
<p>|                          | • any – Monitors any resource that is going down (generates an event when any one of the specified critical resource is unreachable) |</p>
<table>
<thead>
<tr>
<th><strong>criteria</strong></th>
<th>Configures the resource that will monitor critical resources and update the rest of the devices in a group. Options include all, rf-domain-manager, or cluster-master.</th>
</tr>
</thead>
</table>
| [all]cluster-master rf-domain-manager | - all – Configures all devices within a group (cluster or RF Domain) as the monitoring resource  
- cluster-master – Configures the cluster master as the monitoring resource  
- rf-domain-manager – Configures the RF Domain manager as the monitoring resource |

<table>
<thead>
<tr>
<th><strong>dhcp vlan &lt;1-4094&gt;</strong></th>
<th>The following parameters are recursive and common to the ‘all’, ‘cluster-master’, and ‘rf-domain-manager’ keywords:</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcp</td>
<td>Configures DHCP as the mode of monitoring critical resources. When configured, DHCP message flows (DHCP Discover, DHCP Offer, etc.) are used instead of ICMP or ARP packets to confirm critical resource availability.</td>
</tr>
</tbody>
</table>
| vlan <1-4094> | Configures the VLAN on which the critical resource(s) is available  
- <1-4094> – Specify the VLAN from 1 - 4094. |

<table>
<thead>
<tr>
<th><strong>dns &lt;IP HOST ALIAS NAME&gt;</strong></th>
<th>The following parameters are recursive and common to the ‘all’, ‘cluster-master’, and ‘rf-domain-manager’ keywords:</th>
</tr>
</thead>
<tbody>
<tr>
<td>dns</td>
<td>Configures DNS as the mode of monitoring critical resources. When configured, DNS message flows are used instead of ICMP or ARP packets to confirm critical resource availability.</td>
</tr>
<tr>
<td>&lt;IP HOST ALIAS NAME&gt;</td>
<td>Configures the IPv4 address or host alias of the critical resource. Specify the IPv4 address or host alias name (should be existing and configured).</td>
</tr>
</tbody>
</table>

| `{dhcp vlan <1-4094>}|dns <IP HOST ALIAS NAME>} | The ‘dhcp’ and ‘dns’ parameters are recursive and you can optionally configure multiple VLANs and critical resource IPv4 addresses (or host alias names). |
| --- | --- |
| dhcp | Optional. Configures DHCP as the mode of monitoring critical resources. When configured, DHCP message flows (DHCP Discover, DHCP Offer, etc.) are used instead of ICMP or ARP packets to confirm critical resource availability. |
| vlan <1-4094> | Configures the VLAN on which the critical resource(s) is available  
- <1-4094> – Specify the VLAN from 1 - 4094. |
| dns | Optional. Configures DNS as the mode of monitoring critical resources. When configured, DNS message flows are used instead of ICMP or ARP packets to confirm critical resource availability. |
| <IP HOST ALIAS NAME> | Configures the IPv4 address or host alias of the critical resource. Specify the IPv4 address or host alias name (should be existing and configured). |

- critical-resource <CRM-POLICY-NAME> monitor-using-flows [all any] dhcp vlan <1-4094> {dhcp vlan <1-4094>}|dns <IP HOST ALIAS NAME>|

| <CRM-POLICY-NAME> | Creates a critical resource monitoring policy, identified by the <CRM-POLICY-NAME> keyword. Provide the CRM policy name. |

| monitor-using-flows | Enables critical resource(s) monitoring using message flows for DHCP or DNS (DHCP Discover, DHCP Offer, etc.) instead of ICMP or ARP packets in order to reduce the amount of traffic on the network. |
| **[all|any]** | Configures how critical resource event messages are generated. Options include *all* and *any*.
| | • all – Monitors all resources that are going down (generates an event when all specified critical resources are unreachable)
| | • any – Monitors any resource that is going down (generates an event when any one of the specified critical resource is unreachable) |

| **dhcp vlan <1-4094>** | Configures DHCP as the mode of monitoring critical resources. When configured, DHCP message flows (DHCP Discover, DHCP Offer, etc.) are used instead of ICMP or ARP packets to confirm critical resource availability.
| | • vlan <1-4094> – Configures the VLAN on which the critical resource(s) is available
| | • <1-4094> – Specify the VLAN from 1 - 4094. |

| **{dhcp vlan <1-4094>|dns <IP/HOST-ALIAS-NAME>}** | The following parameters are recursive and optional. Use them to configure multiple VLANs and critical resource IPv4 addresses (or host alias names):
| | • dhcp – Optional. Configures DHCP as the mode of monitoring critical resources. When configured, DHCP message flows (DHCP Discover, DHCP Offer, etc.) are used instead of ICMP or ARP packets to confirm critical resource availability.
| | • vlan <1-4094> – Configures the VLAN on which the critical resource(s) is available
| | • <1-4094> – Specify the VLAN from 1 - 4094. |
| | • dns – Optional. Configures DNS as the mode of monitoring critical resources. When configured, DNS message flows are used instead of ICMP or ARP packets to confirm critical resource availability.
| | • <IP/HOST-ALIAS-NAME> – Configures the IPv4 address or host alias of the critical resource. Specify the IPv4 address or host alias name (should be existing and configured). |

- **critical-resource <CRM-POLICY-NAME>** monitor-using-flows [all|any]
dns <IP/HOST-ALIAS-NAME> {dhcp vlan <1-4094>|dns <IP/HOST-ALIAS-NAME>}

| **<CRM-POLICY-NAME>** | Creates a critical resource monitoring policy, identified by the <CRM-POLICY-NAME> keyword. Provide the CRM policy name. |
| **monitor-using-flows** | Enables critical resource(s) monitoring using message flows for DHCP or DNS (DHCP Discover, DHCP Offer, etc.) instead of ICMP or ARP packets in order to reduce the amount of traffic on the network. |
| **[all|any]** | Configures how critical resource event messages are generated. Options include *all* and *any*.
| | • all – Monitors all resources that are going down (generates an event when all specified critical resources are unreachable)
| | • any – Monitors any resource that is going down (generates an event when any one of the specified critical resource is unreachable) |

| **dns <IP/HOST-ALIAS-NAME>** | Configures DNS as the mode of monitoring critical resources. When configured, DNS message flows are used instead of ICMP or ARP packets to confirm critical resource availability.
| | • <IP/HOST-ALIAS-NAME> – Configures the IPv4 address or host alias of the critical resource. Specify the IPv4 address or host alias name (should be existing and configured). |
The following parameters are recursive and optional. Use them to configure multiple VLANs and critical resource IPv4 addresses (or host alias names):

- **dhcp** – Optional. Configures DHCP as the mode of monitoring critical resources. When configured, DHCP message flows (DHCP Discover, DHCP Offer, etc.) are used instead of ICMP or ARP packets to confirm critical resource availability.
  - **vlan <1-4094>** – Configures the VLAN on which the critical resource(s) is available
  - **<1-4094>** – Specify the VLAN from 1 - 4094.

- **dns** – Optional. Configures DNS as the mode of monitoring critical resources. When configured, DNS message flows are used instead of ICMP or ARP packets to confirm critical resource availability.
  - **<IP/HOST-ALIAS-NAME>** – Configures the IPv4 address or host alias of the critical resource. Specify the IPv4 address or host alias name (should be existing and configured).

- **criteria**
  - **[all|cluster-master|rf-domain-manager]**
    - **all** – Configures all devices within a group (cluster or RF Domain) as the monitoring resource
    - **cluster-master** – Configures the cluster master as the monitoring resource
    - **rf-domain-manager** – Configures the RF Domain manager as the monitoring resource

<table>
<thead>
<tr>
<th>&lt;CRM-POLICY-NAME&gt;</th>
<th>Creates a critical resource monitoring policy, identified by the &lt;CRM-POLICY-NAME&gt; keyword. Provide the CRM policy name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>monitor-using-flows</td>
<td>Enables critical resource(s) monitoring using message flows for DHCP or DNS (DHCP Discover, DHCP Offer, etc.) instead of ICMP or ARP packets in order to reduce the amount of traffic on the network.</td>
</tr>
</tbody>
</table>
| [all|any] | Configures how critical resource event messages are generated. Options include all and any.
  - **all** – Monitors all resources that are going down (generates an event when all specified critical resources are unreachable)
  - **any** – Monitors any resource that is going down (generates an event when any one of the specified critical resource is unreachable)

| syn-adoptees | Syncs adopted access points with the controller. In the stand-alone AP scenario, where the CRM policy is running on the AP, the AP is directly intimated in case a critical resource goes down. On the other hand, when an AP is adopted to a controller (running the CRM policy), it is essential to enable the syn-adoptees option in order to sync the AP with the controller regarding the latest CRM status. |
| criteria | Configures the resource that will monitor critical resources and update the rest of the devices in a group. Options include all, rf-domain-manager, or cluster-master.
  - **all** – Configures all devices within a group (cluster or RF Domain) as the monitoring resource
  - **cluster-master** – Configures the cluster master as the monitoring resource
  - **rf-domain-manager** – Configures the RF Domain manager as the monitoring resource

| dhcp vlan <1-4094> | The following parameters are recursive and common to the ‘all’, ‘cluster-master’, and ‘rf-domain-manager’ keywords:
  - **dhcp** – Configures DHCP as the mode of monitoring critical resources. When configured, DHCP message flows (DHCP Discover, DHCP Offer, etc.) are used instead of ICMP or ARP packets to confirm critical resource availability.
  - **vlan <1-4094>** – Configures the VLAN on which the critical resource(s) is available
  - **<1-4094>** – Specify the VLAN from 1 - 4094. |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| `critical-resource monitor interval <5-86400>` | Configures the critical resource monitoring frequency. This is the interval between two successive pings to the critical resource being monitored.  
  - `<5-86400>` – Specifies the frequency in seconds. Specify the time from 5 - 86400 seconds. The default is 30 seconds. |
| `retry-count <0-10>` | Configures the maximum number of failed attempts allowed to connect to a critical resource, using DHCP/DNS message flows, before marking it as down.  
  - `<0-10>` – Specifies the maximum number of retries from 0 - 10. The default value is 3 attempts. |
Examples

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#critical-resource test monitor direct all 192.168.13.10 arp-only vlan 1
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#critical-resource monitor interval 40

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#show context
rfs6000 B4-C7-99-6D-B5-D4
use profile default-rfs6000
use rf-domain default
hostname rfs6000-6DB5D4
license AP
6c781f42a3638757d8849c38268b4ea48e483e2f986ae392ebcdd6a8f6f309443e93ad3123c3d76
mint mlcp ip
ip default-gateway 192.168.13.2
interface vlan1
ip address 192.168.13.16/24
ip dhcp client request options all
cluster mode standby
cluster member ip 192.168.13.16 level 1
controller host 192.168.13.13

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#critical-resource test monitor direct all 192.168.13.10 arp-only vlan 1

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#
7.1.17 crypto

Profile Config Commands

Use the crypto command to define a system-level local ID for Internet Security Association and Key Management Protocol (ISAKMP) negotiation and to enter the ISAKMP policy, ISAKMP client, or ISAKMP peer command set. The following table summarizes crypto configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>crypto</td>
<td>Invokes commands used to configure ISAKMP policy, ISAKMP client, and ISAKMP peer</td>
<td>page 7-72</td>
</tr>
<tr>
<td>crypto-auto-ipsec-tunnel</td>
<td>Creates an auto IPSec VPN tunnel and enters its configuration mode</td>
<td>page 7-78</td>
</tr>
<tr>
<td>crypto-ikev1/ikev2-policy</td>
<td>Creates a crypto IKEv1/IKEv2 policy and enters its configuration mode</td>
<td>page 7-85</td>
</tr>
<tr>
<td>crypto-ikev1/ikev2-peer</td>
<td>Creates a IKEv1/IKEv2 peer and enters its configuration mode</td>
<td>page 7-93</td>
</tr>
<tr>
<td>crypto-map-config-commands</td>
<td>Creates a crypto map and enters its configuration mode</td>
<td>page 7-101</td>
</tr>
<tr>
<td>crypto-remote-vpn-client</td>
<td>Creates a remote VPN client and enters its configuration mode</td>
<td>page 7-126</td>
</tr>
</tbody>
</table>
7.1.17.1 crypto

Use the crypto command to define a system-level local ID for ISAKMP negotiation and enter the ISAKMP policy, ISAKMP client, or ISAKMP peer configuration mode.

A crypto map entry is a single policy that describes how certain traffic is secured. There are two types of crypto map entries: ipsec-manual and ipsec-ike entries. Each entry is given an index (used to sort the ordered list).

When a non-secured packet arrives on an interface, the crypto map associated with that interface is processed (in order). If a crypto map entry matches the non-secured traffic, the traffic is discarded.

When a packet is transmitted on an interface, the crypto map associated with that interface is processed. The first crypto map entry that matches the packet is used to secure the packet. If a suitable Security Association (SA) exists, it is used for transmission. Otherwise, IKE is used to establish a SA with the peer. If no SA exists (and the crypto map entry is "respond only"), the packet is discarded.

When a secured packet arrives on an interface, its Security Parameter Index (SPI) is used to look up a SA. If a SA does not exist (or if the packet fails any of the security checks), it is discarded. If all checks pass, the packet is forwarded normally.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

crypto [auto-ipsec-secure|enable-ike-uniqueids|ike-version|ikev1|ikev2|ipsec|load-management|map|pki|plain-text-deny-acl-scope|remote-vpn-client]
crypto [auto-ipsec-secure|enable-ike-uniqueids|load-management]
crypto ike-version [ikev1-only|ikev2-only]
crypto ikev1 [dpd-keepalive <10-3600>|dpd-retries <1-100>|nat-keepalive <10-3600>|peer <IKEV1-PEER>|policy <IKEV1-POLICY-NAME>|remote-vpn]
crypto ikev2 [cookie-challenge-threshold <1-100>|dpd-keepalive <10-3600>|dpd-retries <1-100>|nat-keepalive <10-3600>|peer <IKEV2-PEER>|policy <IKEV2-POLICY-NAME>|remote-vpn]
crypto ipsec [df-bit|security-association|transform-set]
crypto ipsec df-bit [clear|copy|set]
crypto ipsec security-association lifetime [kilobytes <500-2147483646>|seconds <120-86400>]
crypto map <CRYPTO-MAP-TAG> <1-1000> [ipsec-isakmp {dynamic}|ipsec-manual]
crypto pki import crl <TRUSTPOINT-NAME> URL <1-168>
crypto plain-text-deny-acl-scope [global|interface]
crypto remote-vpn-client

Parameters

- crypto [auto-ipsec-secure|enable-ike-uniqueids|load-management]

| auto-ipsec-secure | Configures the Auto IPSec Secure parameter settings. For Auto IPSec tunnel configuration commands, see crypto-auto-ipsec-tunnel commands. |
| enable-ike-uniques | Enables *Internet Key Exchange* (IKE) unique ID check For more information on IKE unique IDs, see `remotegw`. |
| load-management | Configures load management for platforms using software cryptography |

**crypto ike-version** [ikev1-only|ikev2-only]

- **ike-version** [ikev1-only|ikev2-only] Selects and starts the IKE daemon
  - ikev1-only – Enables support for IKEv1 tunnels only
  - ikev2-only – Enables support for IKEv2 tunnels only

**crypto ikev1** [dpd-keepalive <10-3600>|dpd-retries <1-1000>|nat-keepalive <10-3600>|peer <IKEV1-PEER>|policy <IKEV1-POLICY-NAME>|remote-vpn]

| dpd-keepalive <10-3600> | Sets the global *Dead Peer Detection* (DPD) keep alive interval from 10 - 3600 seconds. This is the interval between successive IKE keep alive messages sent to detect if a peer is dead or alive. The default is 30 seconds. |
| dpd-retries <1-1000> | Sets the global DPD retries count from 1 - 1000. This is the number of keep alive messages sent to a peer before the tunnel connection is declared as dead. The default is 5. |
| nat-keepalive <10-3600> | Sets the global NAT keep alive interval from 10 - 3600 seconds. This is the interval between successive NAT keep alive messages sent to detect if a peer is dead or alive. The default is 20 seconds. |
| peer <IKEV1-PEER> | Specify the name/Identifier for the IKEv1 peer. For IKEV1 peer configuration commands, see `crypto-ikev1/ikev2-peer commands`. |
| policy <IKEV1-POLICY-NAME> | Configures an ISKAMP policy. Specify the name of the policy. The local IKE policy and the peer IKE policy must have matching group settings for successful negotiations. For IKEV1 policy configuration commands, see `crypto-ikev1/ikev2-policy commands`. |
| remote-vpn | Specifies the IKEV1 remote-VPN server configuration (responder only) |

**crypto ikev2** [cookie-challenge-threshold <1-100>|dpd-keepalive <10-3600>|dpd-retries <1-1000>|nat-keepalive <10-3600>|peer <IKEV2-PEER>|policy <IKEV2-POLICY-NAME>|remote-vpn]

<p>| cookie-challenge-threshold &lt;1-100&gt; | Starts the cookie challenge mechanism after the number of half open IKE SAs exceeds the specified limit. Specify the limit from 1 - 100. The default is 5. |
| dpd-keepalive &lt;10-3600&gt; | Sets the global DPD keepalive interval from 10 - 3600 seconds. The default is 30 seconds. |
| dpd-retries &lt;1-100&gt; | Sets the global DPD retries count from 1 - 100. The default is 5. |
| nat-keepalive &lt;10-3600&gt; | Sets the global NAT keepalive interval from 10 - 3600 seconds. The default is 20 seconds. |
| peer &lt;IKEV2-PEER&gt; | Specify the name/Identifier for the IKEv2 peer |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>policy &lt;IKEV2-POLICY-NAME&gt;</td>
<td>Configures an ISKAMP policy. Specify the policy name. The local IKE policy and the peer IKE policy must have matching group settings for successful negotiations.</td>
</tr>
<tr>
<td>remote-vpn</td>
<td>Specifies an IKEv2 remote-VPN server configuration (responder only)</td>
</tr>
</tbody>
</table>

- `crypto ipsec df-bit [clear|copy|set]`

- `ipsec` Configures the IPSec policy parameters

- `df-bit [clear|copy|set]` Configures Don’t-Fragment (DF) bit handling for encapsulating header. The options are:
  - clear – Clears the DF bit in the outer header and ignores in the inner header
  - copy – Copies the DF bit from the inner header to the outer header. This is the default setting.
  - set – Sets the DF bit in the outer header

- `crypto ipsec security-association lifetime [kilobytes <500-2147483646> | seconds <120-86400>]`

- `ipsec` Configures the IPSec policy parameters

- `security-association` Configures the IPSec SAs parameters

- `lifetime [kilobyte |seconds]` Defines the IPSec SAs lifetime (in kilobytes and/or seconds). Values can be entered in both kilobytes and seconds, which ever limit is reached first, ends the SA. When the SA lifetime ends it is renegotiated as a security measure.
  - kilobytes – Specifies a volume-based key duration (minimum is 500 KB and maximum is 2147483646 KB)
    - `<500-2147483646>` – Specify a value from 500 - 2147483646 KB. The default is 4608000 KB.
  - seconds – Specifies a time-based key duration (minimum is 120 seconds and maximum is 86400 seconds)
    - `<120-86400>` – Specify a value from 120 - 86400 seconds. The default is 3600 seconds.

The security association lifetime can be overridden under crypto maps.


- `ipsec` Configures the IPSec policy parameters

- `transform-set <TRANSFORM-SET-TAG>` Defines the transform set configuration (authentication and encryption) for securing data. A transform set is a combination of security protocols, algorithms and other settings applied to IPSec protected traffic.
  - `<TRANSFORM-SET-TAG>` – Specify the transform set name.

After specifying the transform set used by the IPSec transport connection, set the encryption method and the authentication scheme used with the transform set. The encryption methods available are: DES, 3DES, AES, AES-192 and AES-256. The authentication schemes available are: esp-md5-hmac and esp-sha-hmac.

- `esp-3des` Configures the ESP transform using 3DES cipher (168 bits). The transform set is assigned to a crypto map using the map’s `set > transform-set` command.
| **esp-aes** | Configures the ESP transform using Advanced Encryption Standard (AES) cipher. The transform set is assigned to a crypto map using the map's `set > transform-set` command. |
| **esp-aes-192** | Configures the ESP transform using AES cipher (192 bits). The transform set is assigned to a crypto map using the map's `set > transform-set` command. |
| **esp-aes-256** | Configures the ESP transform using AES cipher (256 bits). The transform set is assigned to a crypto map using the map's `set > transform-set` command. This is the default setting. |
| **esp-des** | Configures the ESP transform using Data Encryption Standard (DES) cipher (56 bits). The transform set is assigned to a crypto map using the map's `set > transform-set` command. |
| **esp-null** | Configures the ESP transform with no encryption |

The following keywords are common to all of the above listed transform sets. After specifying the transform set type, configure the authentication scheme used to validate identity credentials. The options are:

- **esp-aes-xcbc-mac** – Configures ESP transform using AES-XCBC authorization
- **esp-md5-hmac** – Configures ESP transform using HMAC-MD5 authorization
- **esp-sha-hmac** – Configures ESP transform using HMAC-SHA authorization. This is the default setting.
- **esp-sha256-hmac** – Configures ESP transform using HMAC-SHA256 authorization

| **crypto map <CRYPTO-MAP-TAG> <1-1000> [ipsec-isakmp {dynamic}] ipsec-manual** |

* floor: map

- Configures the crypto map, a software configuration entity that selects data flows that require security processing. The crypto map also defines the policy for these data flows.
- `<CRYPTO-MAP-TAG>` – Specify a name for the crypto map. The name should not exceed 32 characters. For crypto map configuration commands, see `crypto-map-ipsec-manual-instance`.

| **<1-1000>** | Defines the crypto map entry sequence. Each crypto map uses a list of entries, each entry having a specific sequence number. Specifying multiple sequence numbers within the same crypto map provides the flexibility to connect to multiple peers from the same interface. Specify a value from 1 - 1000. |

| **ipsec-isakmp {dynamic}** | Configures IPSEC w/ISAKMP.
- dynamic – Optional. Configures dynamic map entry (remote VPN configuration) for XAUTH with mode-config or ipsec-l2tp configuration |

| **ipsec-manual** | Configures IPSEC w/manual keying. Remote configuration is not allowed for manual crypto map. |

| **crypto pki import crl <TRUSTPOINT-NAME> <URL> <1-168>** |

* floor: pki

- Configures certificate parameters. The Public Key Infrastructure (PKI) protocol creates encrypted public keys using digital certificates from certificate authorities.

- Imports a trustpoint related configuration
crl
<TRUSTPOINT-NAME>
Imports a Certificate Revocation List (CRL). Imports a trustpoint including either a private key and server certificate or a certificate authority (CA) certificate or both. A CRL is a list of revoked certificates that are no longer valid. A certificate can be revoked if the CA had improperly issued a certificate, or if a private-key is compromised. The most common reason for revocation is the user no longer being in sole possession of the private key.
• <TRUSTPOINT-NAME> – Specify the trustpoint name.

<URL>
Specify the CRL source address in the following format. Both IPv4 and IPv6 address formats are supported.
ftp://<hostname|IPv4 or IPv6>[:port]/path/file
ftp://<user>:<passwd>@<hostname|IPv4 or IPv6>[:port]/path/file
sftp://<user>:<passwd>@<hostname|IPv4 or IPv6>[:port]/path/file
http://<hostname|IPv4 or IPv6>[:port]/path/file
cf:/path/file
usb<n>:/path/file

<1-168>
Sets command replay duration from 1 - 168 hours. This is the interval (in hours) after which devices using this profile copy a CRL file from an external server and associate it with a trustpoint.

Examples
rfs7000-37FABE(config-profile-default-rfs7000)#crypto ipsec transform-set tpsec-tag1 esp-aes-256 esp-md5-hmac
rfs7000-37FABE(config-profile-default-rfs7000)#crypto map map1 10 ipsec-isakmp dynamic
rfs7000-37FABE(config-profile-default-rfs7000)#crypto plain-text-deny-acl-scope interface

plain-text-deny-acl-scope
Configures plain-text-deny-acl-scope parameters

global
Applies the plain text deny ACL globally. This is the default setting.

interface
Applies the plain text deny ACL to the interface only

• crypto remote-vpn-client

remote-vpn-client
Configures remote VPN client settings. For more information, see crypto-remote-vpn-client commands.
crypto map map1 10 ipsec-isakmp dynamic
crypto ikev1 remote-vpn
crypto ikev2 remote-vpn
crypto auto-ipsec-secure

crypto plain-text-deny-acl-scope interface
  interface radio1
  interface radio2
  interface up

rfs7000-37FABE(config-profile-default-rfs7000)#

rfs7000-37FABE(config-profile-default-rfs7000)#crypto ipsec transform-set tag1 esp-null
  esp-md5-hmac

rfs7000-37FABE(config-profile-default-rfs7000-transform-set-tag1)#?

Crypto Ipsec Configuration commands:
  no       Negate a command or set its defaults
  mode     Encapsulation mode (transport/tunnel)
  clrscr   Clears the display screen
  commit   Commit all changes made in this session
  end      End current mode and change to EXEC mode
displays End current mode and down to previous mode
  help     Description of the interactive help system
  revert   Revert changes
  service  Service Commands
  show     Show running system information
  write    Write running configuration to memory or terminal

rfs7000-37FABE(config-profile-default-rfs7000-transform-set-tag1)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables or reverts settings to their default</td>
</tr>
</tbody>
</table>
7.1.17.2 crypto-auto-ipsec-tunnel commands

`crypto`

Creates an auto IPSec VPN tunnel and changes the mode to auto-ipsec-secure mode for further configuration.

Auto IPSec tunneling provides a secure tunnel between two networked peer controllers or service platforms and associated access points that are within a range of valid IP addresses. You can define which packets are sent within the tunnel, and how they are protected. When a tunnelled peer sees a sensitive packet, it creates a secure tunnel and sends the packet through the tunnel to its remote peer destination or associated access point.

Tunnels are sets of SA between two peers. SAs define the protocols and algorithms applied to sensitive packets and specify the keying mechanisms used by tunnelled peers. SAs are unidirectional and exist in both the inbound and outbound direction. SAs are established per the rules and conditions of defined security protocols (AH or ESP).

The IKE protocol is a key management protocol used in conjunction with IPSec. IKE enhances IPSec by providing additional features, flexibility, and configuration simplicity for the IPSec standard. IKE enables secure communications without time consuming manual pre-configuration for auto IPSec tunneling.

```
rfs7000-37FABE(config-profile-default-rfs7000)#crypto auto-ipsec-secure
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#?
```

Crypto Auto IPSEC Tunnel commands:

- `groupid` Local/Remote identity and Authentication credentials for Auto IPSec Secure IKE negotiation
- `ike-lifetime` Set lifetime for ISAKMP security association
- `ikev2` IKEv2 configuration commands
- `ip` Internet Protocol config commands
- `no` Negate a command or set its defaults
- `remotegw` Auto IPSec Secure Remote Peer IKE

```
cmp
   clrscr        Clears the display screen
   commit        Commit all changes made in this session
   do            Run commands from Exec mode
   end           End current mode and change to EXEC mode
   exit          End current mode and down to previous mode
   help          Description of the interactive help system
   revert        Revert changes
   service       Service Commands
   show          Show running system information
   write         Write running configuration to memory or terminal
```

```

rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#
```

The following table summarizes the crypto IPSec auto tunnel configuration mode commands:

**Table 7.5 Crypto IPSec Config Mode Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>groupid</code></td>
<td>Specifies the identity string used for IKE authentication</td>
<td>page 7-79</td>
</tr>
<tr>
<td><code>ip</code></td>
<td>Enables the controller or service platform to uniquely identify APs and the hosts present in the AP’s subnet</td>
<td>page 7-80</td>
</tr>
<tr>
<td><code>ike-lifetime</code></td>
<td>Configures the IKE SA's key lifetime in seconds</td>
<td>page 7-81</td>
</tr>
<tr>
<td><code>ikev2</code></td>
<td>Enables the forced re-authentication of IKEv2 peer</td>
<td>page 7-82</td>
</tr>
<tr>
<td><code>remotegw</code></td>
<td>Defines the IKE version used for an auto IPSec tunnel using secure gateways</td>
<td>page 7-83</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Removes or reverts the crypto auto IPSec tunnel settings</td>
<td>page 7-84</td>
</tr>
</tbody>
</table>
7.17.2.1 groupid

crypto-auto-ipsec-tunnel commands

Specifies the identity string used for IKE authentication

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

groupid <WORD> [psk|rsa]
groupid <WORD> [psk [0 <WORD>|2 <WORD>|<WORD>]|rsa]

Parameters

- groupid <WORD> [psk [0 <WORD>|2 <WORD>|<WORD>]|rsa]

<table>
<thead>
<tr>
<th>&lt;WORD&gt;</th>
<th>Specifies a string not exceeding 64 characters. This is the group identity used for IKE exchange for auto IPSec secure peers. After providing a group ID, specify the authentication method used to authenticate peers on the auto IPSec secure tunnel. The options are: psk and rsa.</th>
</tr>
</thead>
</table>
| psk [0 <WORD>|2 <WORD>|<WORD>] | Configures the pre-shared key (PSK) as the authentication type for secure peer authentication on the auto IPSec secure tunnel
  - 0 <WORD> – Configures a clear text key
  - 2 <WORD> – Configures an encrypted key
  - <WORD> – Specify a string value from 8 - 21 characters. |
| rsa | Configures the Rivest-Shamir-Adleman (RSA) key. RSA is an algorithm for public key cryptography. It is the first algorithm known to be suitable for signing, as well as encryption. This is the default setting. |

NOTE: Only one group ID is supported on the controller or service platform. All APs, controllers, and service platform must use the same group ID.

Examples

rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#groupid
testgroup@123 rsa
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#show context
crypto auto-ipsec-secure
groupid testgroup@123 rsa
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#
7.1.17.2.2 ip

crypto-auto-ipsec-tunnel commands

Enables the controller to uniquely identify APs and the hosts present in the AP’s subnet. This allows the controller to correctly identify the destination host and create a dynamic site-to-site VPN tunnel between the host and the private network behind the controller.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ip nat crypto

Parameters

- ip nat crypto

<table>
<thead>
<tr>
<th>ip nat crypto</th>
<th>Enables unique identification of APs and the hosts present in each AP’s subnet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Providing a unique ID enables the access point, wireless controller, or service platform to uniquely identify the destination device. This is essential in networks where there are multiple APs behind a router, or when two (or more) APs behind two (or more) different routers have the same IP address. Further, the same subnet exists behind these APs. For example, let us consider a scenario where there are two APs (A and B) behind two routers (1 and 2). AP ‘A’ is behind router ‘1’. And AP ‘B’ is behind router ‘2’. Both these APs have the same IP address (192.168.13.8). The subnet behind APs A and B is also the same (100.1.1.0/24). In such a scenario the controller fails to uniquely identify the hosts present in either AP’s subnet.</td>
</tr>
</tbody>
</table>

For more information, see remotegw and crypto.

Examples

rfs4000-229D58(config-profile-test)RFS4000-crypto-auto-ipsec-secure)#ip nat crypto
rfs4000-229D58(config-profile-test)RFS4000-crypto-auto-ipsec-secure)#show context crypto auto-ipsec-secure
remotegw ike-version ikev2 uniqueid
ip nat crypto
rfs4000-229D58(config-profile-test)RFS4000-crypto-auto-ipsec-secure)#
7.1.17.2.3 ike-lifetime

crypto-auto-ipsec-tunnel commands

Configures the IKE SA’s key lifetime in seconds.

The lifetime defines how long a connection (encryption/authentication keys) should last, from successful key negotiation to expiration. Two peers need not exactly agree on the lifetime, though if they do not, there is some clutter for a superseded connection on the peer defining the lifetime as longer.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
ike-lifetime <600-86400>

Parameters
- ike-lifetime <600-86400>

<table>
<thead>
<tr>
<th>ike-lifetime &lt;600-86400&gt;</th>
<th>Sets the IKE SA’s key lifetime in seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;600-86400&gt; – Specify a value from 600 - 86400 seconds. The default is 8600 seconds.</td>
</tr>
</tbody>
</table>

Examples
rfs4000-229D58 (config-profile-testRFS4000-crypto-auto-ipsec-secure)# ike-lifetime 800
rfs4000-229D58 (config-profile-testRFS4000-crypto-auto-ipsec-secure)# show context crypto auto-ipsec-secure
ike-lifetime 800
rfs4000-229D58 (config-profile-testRFS4000-crypto-auto-ipsec-secure)#
7.17.2.4 ikev2

crypto-auto-ipsec-tunnel commands

Enables the forced IKEv2 peer re-authentication. This option is disabled by default.

In most IPSec tunnel configurations, the lifetime of IKE SAs between peers is limited. Once the IKE SA key expires it is renegotiated. In such a scenario, the IKEv2 tunnel peers may or may not re-authenticate themselves. When enabled, IKE tunnel peers have to re-authenticate each time the IKE SA is renegotiated.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6662, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
ikev2 peer reauth

Parameters
- ikev2 peer reauth

ikev2 peer reauth | Enables IKEv2 peer re-authentication. When enabled, IKE tunnel peers are forced to re-authenticate each time the IKE key is renegotiated.

Examples
rfs4000-229D58(config-profile-testRFS4000-crypto-auto-ipsec-secure)#ikev2 peer reauth
7.1.17.2.5 remotegw

crypto-auto-ipsec-tunnel commands

Defines the IKE version used for auto IPSEC tunnel negotiation with the IPSec remote gateway other than the controller

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
remotegw ike-version [ikev1-aggr|ikev1-main|ikev2] {uniqueid}

Parameters
- remotegw ike-version [ikev1-aggr|ikev1-main|ikev2] {uniqueid}

remotegw ike-version | Configures the IKE version used for initiating auto IPSec tunnel with secure gateways other than the controller
ikev1-aggr | Aggregation mode is used by the auto IPSec tunnel initiator to set up the connection
ikev1-main | Main mode is used by the auto IPSec tunnel initiator to establish the connection
ikev2 | IKEv2 is the preferred method when wireless controller/AP only is used
uniqueid | This keyword is common to all of the above parameters.
    - uniqueid – Optional. Enables the assigning of a unique ID to APs (using this profile) behind a router by prefixing the MAC address to the group ID
Providing a unique ID enables the access point, wireless controller, or service platform to uniquely identify the destination device. This is essential in networks where there are multiple APs behind a router, or when two (or more) APs behind two (or more) different routers have the same IP address. For example, let us consider a scenario where there are two APs (A and B) behind two routers (1 and 2). AP 'A' is behind router '1'. And AP 'B' is behind router '2'. Both these APs have the same IP address (192.168.13.8). In such a scenario, the controller fails to establish an Auto IPSec VPN tunnel to either APs, because it is unable to uniquely identify them.
After enabling unique ID assignment, enable IKE unique ID check. For more information, see crypto.

Examples
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#remotegw
ike-version ikev2 uniqueid
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#show context
crypto auto-ipsec-secure
remotegw ike-version ikev2 uniqueid
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#
7.1.17.2.6 no

**crypto-auto-ipsec-tunnel commands**

Removes or resets this auto IPSec tunnel settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no [groupid|ike-lifetime|ikev2 peer reauth|ip nat crypto]
```

**Parameters**

- `no <PARAMETERS>`

  Removes or resets this auto IPSec tunnel’s settings based on the parameters passed

**Examples**

The following example shows the Auto IPSec VLAN bridge settings before the ‘no’ command is executed:

```
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#show context
crypto auto-ipsec-secure
    groupid testpassword@123 rsa
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#
```

```
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#no groupid
```

The following example shows the Auto IPSec VLAN bridge settings after the ‘no’ command is executed:

```
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#show context
crypto auto-ipsec-secure
rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#
```

```
x4500-5CFA2B(config-profile-testRFS4000-crypto-auto-ipsec-secure)#no ikev2 peer reauth
```

```
x4500-5CFA2B(config-profile-testRFS4000-crypto-auto-ipsec-secure)#show context
crypto auto-ipsec-secure
    no ikev2 peer reauth
    ike-lifetime 800
x4500-5CFA2B(config-profile-testRFS4000-crypto-auto-ipsec-secure)#
```

```
x4500-5CFA2B(config-profile-testRFS4000-crypto-auto-ipsec-secure)#no ike-lifetime
```

```
x4500-5CFA2B(config-profile-testRFS4000-crypto-auto-ipsec-secure)#show context
crypto auto-ipsec-secure
    no ikev2 peer reauth
x4500-5CFA2B(config-profile-testRFS4000-crypto-auto-ipsec-secure)#
```
7.1.17.3 crypto-ikev1/ikev2-policy commands

**crypto**

Defines crypto-IKEv1/IKEv2 commands in detail

IKE protocol is a key management protocol standard used in conjunction with IPSec. IKE enhances IPSec by providing additional features, flexibility, and configuration simplicity for the IPSec standard. IKE automatically negotiates IPSec SAs and enables secure communications without time consuming manual pre-configuration.

Use the (config) instance to configure IKEv1/IKEv2 policy configuration commands.

To navigate to the IKEv1/IKEv2 policy config instance, use the following commands:

```plaintext
<DEVICE>(config)#profile <DEVICE-TYPE> <PROFILE-NAME>
<DEVICE>(config-profile-<PROFILE-NAME>)#crypto ikev1/ikev2 policy
```

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000)#crypto ikev1 policy ikev1-testpolicy
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-ikev1-testpolicy)#?
```

Crypto IKEv1 Policy Configuration commands:
- `dpd-keepalive`: Set Dead Peer Detection interval in seconds
- `dpd-retries`: Set Dead Peer Detection retries count
- `isakmp-proposal`: Configure ISAKMP Proposals
- `lifetime`: Set lifetime for ISAKMP security association
- `mode`: IKEv1 mode (main/aggressive)
- `no`: Negate a command or set its defaults

```plaintext
clrscr`: Clears the display screen
```

```plaintext
commit`: Commit all changes made in this session
```

```plaintext
end`: End current mode and change to EXEC mode
```

```plaintext
exit`: End current mode and down to previous mode
```

```plaintext
help`: Description of the interactive help system
```

```plaintext
revert`: Revert changes
```

```plaintext
service`: Service Commands
```

```plaintext
show`: Show running system information
```

```plaintext
write`: Write running configuration to memory or terminal
```

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-ikev1-testpolicy)#
```

```plaintext
rfs7000-37FABE(config-profile-test-ikev2-policy-ikev2-testpolicy)#?
```

Crypto IKEv2 Policy Configuration commands:
- `dpd-keepalive`: Set Dead Peer Detection interval in seconds
- `isakmp-proposal`: Configure ISAKMP Proposals
- `lifetime`: Set lifetime for ISAKMP security association
- `no`: Negate a command or set its defaults
- `sa-per-acl`: Setup single SA for all rules in the ACL (ONLY APPLICABLE FOR SITE-TO-SITE VPN)

```plaintext
clrscr`: Clears the display screen
```

```plaintext
commit`: Commit all changes made in this session
```

```plaintext
do`: Run commands from Exec mode
```

```plaintext
end`: End current mode and change to EXEC mode
```

```plaintext
exit`: End current mode and down to previous mode
```

```plaintext
help`: Description of the interactive help system
```

```plaintext
revert`: Revert changes
```

```plaintext
service`: Service Commands
```

```plaintext
show`: Show running system information
```

```plaintext
write`: Write running configuration to memory or terminal
```

```plaintext
rfs7000-37FABE(config-profile-test-ikev2-policy-ikev2-testpolicy)#
```

---

**NOTE:**IKEv2 being an improved version of the original IKEv1 design, is recommended in most deployments. IKEv2 provides enhanced cryptographic mechanisms, NAT and firewall traversal, attack resistance, etc.
The following table summarizes crypto IKEv1/iKEv2 configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dpd-keepalive</td>
<td>Sets DPD keep alive packet interval</td>
<td>page 7-87</td>
</tr>
<tr>
<td>dpd-retries</td>
<td>Sets the maximum number of attempts for sending DPD keep alive packets</td>
<td>page 7-88</td>
</tr>
<tr>
<td></td>
<td>(applicable only to the IKEv1 policy)</td>
<td></td>
</tr>
<tr>
<td>isakmp-proposal</td>
<td>Configures ISAKMP proposals</td>
<td>page 7-89</td>
</tr>
<tr>
<td>lifetime</td>
<td>Specifies how long an IKE SA is valid before it expires</td>
<td>page 7-90</td>
</tr>
<tr>
<td>mode</td>
<td>Sets the mode of the tunnels (applicable only to the IKEv1 policy)</td>
<td>page 7-91</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts IKEv1/IKEv2 policy settings</td>
<td>page 7-92</td>
</tr>
</tbody>
</table>
7.1.17.3.1 dpd-keepalive

`crypto-ikev1/ikev2-policy commands`

Sets the DPD keep-alive packet interval

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dpd-keepalive <10-3600>

Parameters
- dpd-keepalive <10-3600>

| <10-3600> | Specifies the interval, in seconds, between successive DPD keep alive packets. The IKE keep alive message is used to detect a dead peer on the remote end of the IPSec VPN tunnel. Specify the time from 10 - 3600 seconds. The default is 30 seconds. |

Examples

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-ikev1-testpolicy)#
dpd-keepalive 11
```
```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-ikev1-testpolicy)#show context crypto ikev1 policy testpolicy
dpd-keepalive 11
isakmp-proposal default encryption aes-256 group 2 hash sha
```
```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-ikev1-testpolicy)#
```
7.1.17.3.2 dpd-retries

Sets the maximum number of times DPD keep-alive packets are sent to a peer. Once this value is exceeded, without a response from the peer, the VPN tunnel connection is declared dead. This option is available only for the IKEv1 policy.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dpd-retries <1-100>

Parameters
- dpd-retries <1-100>

<table>
<thead>
<tr>
<th>&lt;1-100&gt;</th>
<th>Declares a peer dead after the specified number of retries. Specify a value from 1 - 100. The default is 5.</th>
</tr>
</thead>
</table>

Examples

rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#dpd-retries 10

rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#show context crypto ikev1 policy testpolicy
dpd-keepalive 11
dpd-retries 10
isakmp-proposal default encryption aes-256 group 2 hash sha
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#
7.1.17.3.3 isakmp-proposal

- **crypto-ikev1/ikev2-policy commands**

Configures ISAKMP proposals and their parameters

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
```

**Parameters**


| <WORD> | Assigns the target peer (tunnel destination) a 32 character maximum name to distinguish it from others with a similar configuration. |
| encryption [3des|aes|aes-192|aes-256] | Configures the encryption method used by the tunneled peers to securely interoperate
  - 3des – Configures triple data encryption standard
  - aes – Configures AES (128 bit keys)
  - aes-192 – Configures AES (192 bit keys)
  - aes-256 – Configures AES (256 bit keys). This is the default setting. |
| group [14|2|5] | Specifies the Diffie-Hellman (DH) group identifier used by VPN peers to derive a shared secret password without having to transmit. DH groups determine the strength of the key used in key exchanges. The higher the group number, the stronger and more secure the key. Options include 2, 5 and 14.
  - 14 – Configures DH group 14
  - 2 – Configures DH group 2. This is the default setting.
  - 5 – Configures DH group 5 |
| hash [aes-xcbc-mac|md5|sha|sha256] | Specifies the hash algorithm used to authenticate data transmitted over the IKE SA. The hash algorithm specified here is used by VPN peers to exchange credential information.
  - aes-xcbc-mac – Uses AES XCBC Auth hash algorithm. This option is applicable only to the IKEv2 policy configuration context.
  - md5 – Uses Message Digest 5 (MD5) hash algorithm
  - sha – Uses Secure Hash Authentication (SHA) hash algorithm. This is the default setting.
  - sha256 – Uses Secure Hash Standard 2 algorithm |

**Examples**

```bash
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-ikev1-testpolicy)#
isakmp-proposal testproposal encryption aes group 2 hash sha
```

```bash
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#show context
crypto ikev1 policy testpolicy
dpd-keepalive 11
dpd-retries 10
isakmp-proposal default encryption aes-256 group 2 hash sha
isakmp-proposal testproposal encryption aes group 2 hash sha
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#
```
7.1.17.3.4 lifetime

crypto-ikev1/ikev2-policy commands

Specifies how long an IKE SA (encryption/authentication keys) is valid. The value specified is the validity period of the IKE SA from successful key negotiation to expiration.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
lifetime <600-86400>

Parameters
- lifetime <600-86400>

<table>
<thead>
<tr>
<th>lifetime &lt;600-86400&gt;</th>
<th>Specifies how many seconds an IKE SA lasts before it expires. Set a time stamp from 600 - 86400 seconds.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;600-86400&gt;</td>
<td>- Specify a value from 600 - 86400 seconds. The default is 86400 seconds.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-test-ikevpolicy)#lifetime 655
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#show context
crypto ikev1 policy testpolicy
dpd-keepalive 11
dpd-retries 10
timeout lifetime 655
isakmp-proposal default encryption aes-256 group 2 hash sha
isakmp-proposal testproposal encryption aes group 2 hash sha
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#
7.1.17.3.5 mode

crypto-ikev1/ikev2-policy commands

Configures the IPSec mode of operation for the IKEv1 policy. This option is not available for IKEv2 policy.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

mode [aggressive|main]

Parameters

- mode [aggressive|main]

| mode [aggressive|main] | Sets the mode of the tunnels |
|------------------------|-----------------------------|
|                        | • aggressive – Initiates the aggressive mode |
|                        | • main – Initiates the main mode |

**Note:** If configuring the IKEv1 IPSec policy, define the IKE mode as either *main* or *aggressive*. In the aggressive mode, 3 messages are exchanged between the IPSec peers to setup the SA. On the other hand, in the main mode, 6 messages are exchanged. The default setting is main.

Examples

rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#mode aggressive

crypto ikev1 policy testpolicy
dpd-keepalive 11
dpd-retries 10
lifetime 655
isakmp-proposal default encryption aes-256 group 2 hash sha
isakmp-proposal testprposal encryption aes group 2 hash sha
mode aggressive
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#
7.1.17.3.6 no

crypto-ikev1/ikev2-policy commands

Removes or reverts IKEv1/IKEv2 policy settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [dpd-keepalive|dpd-retries|isakmp-proposal <WORD>|lifetime|mode]

Parameters

- no <PARAMETERS>

Examples

The following example shows the IKEV1 Policy settings before the ‘no’ commands are executed:

rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#show context crypto ikev1 policy testpolicy
dpd-keepalive 11
dpd-retries 10
lifetime 655
isakmp-proposal default encryption aes-256 group 2 hash sha
isakmp-proposal testpraposal encryption aes group 2 hash sha
mode aggressive
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#

rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#no mode
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#no dpd-keepalive
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#no dpd-retries

The following example shows the IKEV1 Policy settings after the ‘no’ commands are executed:

rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#show context crypto ikev1 policy testpolicy
lifetime 655
isakmp-proposal default encryption aes-256 group 2 hash sha
isakmp-proposal testpraposal encryption aes group 2 hash sha
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#
7.1.17.4 crypto-ikev1/ikev2-peer commands

Use the (config) instance to configure IKEv1/IKEv2 peer configuration commands. To navigate to the IKEv1/IKEv2 peer config instance, use the following commands:

<DEVICE>(config)#profile <DEVICE-TYPE> <PROFILE-NAME>
<DEVICE>(config-profile-<PROFILE-NAME>)#crypto ikev1/ikev2 peer <IKEV1/IKEV2-PEER-NAME>

rfs7000-37FABE(config-profile-default-rfs7000)#crypto ikev1 peer peer1
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#?

Crypto IKEV1 Peer Configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>authentication</td>
<td>Configure Authentication credentials</td>
<td>page 7-95</td>
</tr>
<tr>
<td>ip</td>
<td>Configure peer address/fqdn</td>
<td>page 7-96</td>
</tr>
<tr>
<td>localid</td>
<td>Set local identity</td>
<td>page 7-97</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
<td></td>
</tr>
<tr>
<td>remoteid</td>
<td>Configure remote peer identity</td>
<td></td>
</tr>
<tr>
<td>use</td>
<td>Set setting to use</td>
<td></td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
<td></td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
<td></td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
<td></td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
<td></td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
<td></td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
<td></td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
<td></td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
<td></td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
<td></td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#

rfs7000-37FABE(config-profile-default-rfs7000)#crypto ikev2 peer peer1
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#?

Crypto IKEV2 Peer Configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>authentication</td>
<td>Configure Authentication credentials</td>
<td>page 7-95</td>
</tr>
<tr>
<td>ip</td>
<td>Configure peer address/fqdn</td>
<td>page 7-96</td>
</tr>
<tr>
<td>localid</td>
<td>Set local identity</td>
<td>page 7-97</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
<td></td>
</tr>
<tr>
<td>remoteid</td>
<td>Configure remote peer identity</td>
<td></td>
</tr>
<tr>
<td>use</td>
<td>Set setting to use</td>
<td></td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
<td></td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
<td></td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
<td></td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
<td></td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
<td></td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
<td></td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
<td></td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
<td></td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
<td></td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
<td></td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#

The following table summarizes crypto IPSec IKEv1/IKEv2 peer configuration mode commands:

Table 7.7 Crypto IPSec IKEV1/IKEV2 Peer Config Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>authentication</td>
<td>Configures a peer’s authentication mode and the pre-shared key</td>
<td>page 7-95</td>
</tr>
<tr>
<td>ip</td>
<td>Configures the peer’s IP address</td>
<td>page 7-96</td>
</tr>
<tr>
<td>localid</td>
<td>Configures a peer’s local identity details</td>
<td>page 7-97</td>
</tr>
<tr>
<td>remoteid</td>
<td>Configures a remote peer’s identity details</td>
<td>page 7-98</td>
</tr>
</tbody>
</table>
**Table 7.7** Crypto IPSec IKEv1/IKEv2 Peer Config Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>use</em></td>
<td>Associates an IKEv1 policy and IKEv2 policy with the IKEv1 and IKEv2 peer respectively</td>
<td>page 7-99</td>
</tr>
<tr>
<td><em>no</em></td>
<td>Negates a command or reverts settings to their default. The no command, when used in the ISAKMP policy mode, defaults the ISAKMP protection suite settings.</td>
<td>page 7-100</td>
</tr>
</tbody>
</table>
## 7.1.17.4.1 authentication

rypto-ikev1/ikev2-peer commands

Configures IKEv1/IKEv2 peer's authentication mode and the pre-shared key

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

```plaintext
authentication [psk|rsa]

authentication psk [0 <WORD>|2 <WORD>|<WORD>] {local|remote}

authentication rsa
```

### Parameters

- **authentication psk [0 <WORD>|2 <WORD>|<WORD>] {local|remote}**

  Configures the authentication mode as **pre-shared key** (PSK). The PSK is a string, 8 - 12 characters long. It is shared by both ends of the VPN tunnel connection. If using IKEv2, both a local and remote string must be specified for handshake validation at both ends (local and remote) of the VPN connection.
  - `0 <WORD>` – Configures a clear text key
  - `2 <WORD>` – Configures an encrypted key
  - `<WORD>` – Configures the pre-shared key

  The following keywords are available only in the IKEv2 peer configuration mode:
  - local – Optional. Uses the specified key for local peer authentication only
  - remote – Optional. Uses the specified key for remote peer authentication only

  **Note:** In case the peer type is not specified, this string is used for authenticating both local and remote peers.

- **authentication rsa**

  Configures the authentication mode as **Rivest, Shamir, and Adleman** (RSA) This is the default setting (for both IKEv1 and IKEv2).

  RSA is the first known public-key cryptography algorithm designed signing and encryption. If configuring the IKEv2 peer, the ‘rsa’ option allows you to enable authentication at both ends of the VPN connection (local and remote).

### Examples

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#authentication rsa

rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#authentication psk 0 key@123456

rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#show context
crypto ikev2 peer peer1
  authentication psk 0 key@123456 local
  authentication psk 0 key@123456 remote
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#
```
7.17.4.2 ip

Sets the IP address or Fully Qualified Domain Name (FQDN) of the IPSec VPN peer used in the tunnel setup. Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
ip [address <IP>|fqdn <WORD>]
```

Parameters

- `address <IP>` Specify the peer device’s IP address.
- `fqdn <WORD>` Specify the peer device’s FQDN hostname.

Examples

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#ip address 172.16.10.12
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#show context
crypto ikev1 peer peer1
  ip address 172.16.10.12
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#

rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#ip address 192.168.10.6
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#show context
crypto ikev2 peer peer1
  ip address 192.168.10.6
  authentication psk 0 test@123456 local
  authentication psk 0 test@123456 remote
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#
```
7.17.4.3 localid

- **crypto-ikev1/ikev2-peer commands**

Sets a IKEv1/IKEv2 peer's local identity. This local identifier is used with this peer configuration for an IKE exchange with the target VPN IPSec peer.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
localid [address|autogen-uniqueid|dn|email|fqdn|string]
localid [address <IP>|autogen-uniqueid <WORD>|dn <WORD>|email <WORD>|fqdn <WORD>|
    string <WORD>]
```

**Parameters**

- `localid [address <IP>|dn <WORD>|email <WORD>|fqdn <WORD>|string <WORD>]`

<table>
<thead>
<tr>
<th>address &lt;IP&gt;</th>
<th>Configures the peer's IP address. The IP address is used as local identity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>autogen-uniqueid &lt;WORD&gt;</td>
<td>Generates a localid using the device's unique identity. The system prefixes the device's unique identity to the string provided here. The device's unique identity should be existing and configured. For more information on configuring a device's unique identity, see <code>autogen-uniqueid</code>.</td>
</tr>
<tr>
<td>dn &lt;WORD&gt;</td>
<td>Configures the peer's distinguished name. (for example, &quot;C=us ST=&lt;state&gt; L=&lt;location&gt; O=&lt;organization&gt; OU=&lt;org unit&gt;&quot;. The maximum length is 128 characters.</td>
</tr>
<tr>
<td>email &lt;WORD&gt;</td>
<td>Configures the peer's e-mail address. The maximum length is 128 characters.</td>
</tr>
<tr>
<td>fqdn &lt;WORD&gt;</td>
<td>Configures the peer's FQDN. The maximum length is 128 characters.</td>
</tr>
<tr>
<td>string &lt;WORD&gt;</td>
<td>Configures the peer's identity string. The maximum length is 128 characters. This is the default setting.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#localid email bob@examplecompany.com
```

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#show context crypto ikev1 peer peer1
ip address 172.16.10.12
    localid email bob@examplecompany.com
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#
```
7.17.4.4 remoteid

Configure a IKEv1/IKEV2 peer’s remote identity. This remote identifier is used with this peer configuration for an IKE exchange with the target VPN IPSec peer.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

remoteid [address <IP>|dn <WORD>|email <WORD>|fqdn <WORD>|string <WORD>]

Parameters

- remoteid [address <IP>|dn <WORD>|email <WORD>|fqdn <WORD>|string <WORD>

| address <IP> | Configures the remote IKEv1/IKEV2 peer's IP address. The IP address is used as the peer’s remote identity. |
| dn <WORD>   | Configures the remote peer’s distinguished name. For example, "C=us ST=<state> L=<location> O=<organization> OU=<org unit>". The maximum length is 128 characters. |
| email <WORD>| Configures the remote peer’s e-mail address. The maximum length is 128 characters. |
| fqdn <WORD>| Configures a peer’s FQDN. The maximum length is 128 characters. |
| string <WORD>| Configures a peer’s identity string. The maximum length is 128 characters. |

Examples

rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#remoteid dn SanJose
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#show context crypto ikev1 peer peer1
   ip address 172.16.10.12
   remoteid dn SanJose
   localid email bob@examplecompany.com
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#

rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#remoteid address 157.235.209.63
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#

rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#show context crypto ikev2 peer peer1
   remoteid address 157.235.209.63
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#
7.1.17.4.5 use

- **crypto-ikev1/ikev2-peer commands**

Associates IKEv1/IKEv2 policy with the IKEv1/IKEv2 peer respectively

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
use ikev1-policy <IKEV1-POLICY-NAME>
use ikev2-policy <IKEV2-POLICY-NAME>
```

**Parameters**

- `use ikev1-policy <IKEV1-POLICY-NAME>`
  
  Specify the IKEv1 policy name.
  The local IKEv1 policy and the peer IKEv1 policy must have matching group settings for successful negotiations.

- `use ikev2-policy <IKEV2-POLICY-NAME>`
  
  Specify the IKEv2 policy name.
  The local IKEv2 policy and the peer IKEv2 policy must have matching group settings for successful negotiations.

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#use ikev1-policy test-ikev1policy
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#show context
  crypto ikev1 peer peer1
  ip address 172.16.10.12
  remoteid dn SanJose
  localid email bob@examplecompany.com
  use ikev1-policy test-ikev1policy
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#

rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#use ikev2-policy test-ikev2policy
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#show context
  crypto ikev2 peer peer1
  remoteid address 157.235.209.63
  use ikev2-policy test-ikev2policy
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#
```
7.1.17.4.6 no

**crypto-ikev1/ikev2-peer commands**

Removes or reverts IKEv1/IKEv2 peer settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

no [authentication|ip|localid|remoteid|use <IKEv1/IKEv2-POLICY-NAME>]

**Parameters**

- no <PARAMETERS>

| no <PARAMETERS> | Removes or reverts IKEv1/IKEv2 peer settings based on the parameters passed |

**Examples**

The following example shows the Crypto IKEV1 peer1 settings before the 'no' commands are executed:

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#show context
crypto ikev1 peer peer1
  ip address 172.16.10.12
  remoteid dn SanJose
  localid email bob@examplecompany.com
  use ikev1-policy test-ikev1policy
```

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#no localid
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#no remoteid
```

The following example shows the Crypto IKEV1 peer1 settings after the 'no' commands are executed:

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#show context
crypto ikev1 peer peer1
  ip address 172.16.10.12
  use ikev1-policy test-ikev1policy
```

**The following example shows the Crypto IKEV2 peer1 settings before the 'no' commands are executed:**

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#show context
crypto ikev2 peer peer1
  remoteid address 157.235.209.63
  use ikev2-policy test
```

**The following example shows the Crypto IKEV2 peer1 settings after the 'no' commands are executed:**

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#no use ikev2-policy
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#show context
crypto ikev2 peer peer1
  remoteid address 157.235.209.63
```

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#show context
```
7.1.17.5 crypto-map-config-commands

This section explains crypto map configuration mode commands in detail.
A crypto map entry is a single policy that describes how certain traffic is secured. There are two types of crypto map entries: ipsec-manual and ipsec-ike. Each entry is given an index (used to sort the ordered list).

IPSec VPN provides a secure tunnel between two networked peers. Administrators can define which packets are sent within the tunnel, and how they're protected. When a tunneled peer sees a sensitive packet, it creates a secure tunnel and sends the packet through the tunnel to its remote peer destination.

Tunnels are sets of SA between two peers. SAs define the protocols and algorithms applied to sensitive packets and specify the keying mechanisms used by tunneled peers. SAs are unidirectional and exist in both the inbound and outbound direction. SAs are established per the rules and conditions of defined security protocols (AH or ESP).

IKE is a key management protocol standard used in conjunction with IPSec. IKE enhances IPSec by providing additional features, flexibility, and configuration simplicity for the IPSec standard. IKE automatically negotiates IPSec SAs, and enables secure communications without time consuming manual pre-configuration.

Use crypto maps to configure IPSec VPN SAs. Crypto maps combine the elements comprising IPSec SAs. Crypto maps also include transform sets. A transform set is a combination of security protocols, algorithms and other settings applied to IPSec protected traffic. One crypto map is utilized for each IPSec peer, however for remote VPN deployments one crypto map is used for all the remote IPSec peers.

Use the (config) instance to enter the crypto map configuration mode. To navigate to the crypto-map configuration instance, use the following commands:

In the device-config mode:
```bash
<DEVICE>(config-device-<DEVICE-MAC>)#crypto map <CRYPTO-MAP-TAG> <1-1000>
   [ipsec-isakmp {dynamic}|ipsec-manual]
```

In the profile-config mode:
```bash
<DEVICE>(config-profile-<PROFILE-NAME>)#crypto map <CRYPTO-MAP-TAG> <1-1000>
   [ipsec-isakmp {dynamic}|ipsec-manual]
```

There are three different configurations defined for each listed crypto map: site-to-site manual (ipsec-manual), site-to-site-auto tunnel (ipsec-isakmp), and remote VPN client (ipsec-isakmp dynamic). With site-to-site deployments, an IPSec tunnel is deployed between two gateways, each at the edge of two different remote networks. With remote VPN, an access point located at remote branch defines a tunnel with a security gateway. This facilitates the end points in the branch office to communicate with the destination endpoints (behind the security gateway) in a secure manner.

Each crypto map entry is given an index (used to sort the ordered list).

rfs7000-37FABE(config-profile-default-rfs7000)#crypto map map1 1 ipsec-manual
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#?

Manual Crypto Map Configuration commands:
- `local-endpoint-ip`: Use this IP as local tunnel endpoint address, instead of the interface IP (Advanced Configuration)
- `mode`: Set the tunnel mode
- `no`: Negate a command or set its defaults
- `peer`: Set peer
- `security-association`: Set security association parameters
- `session-key`: Set security session key parameters
- `use`: Set setting to use
- `clrscr`: Clears the display screen
- `commit`: Commit all changes made in this session
- `do`: Run commands from Exec mode
- `end`: End current mode and change to EXEC mode
- `exit`: End current mode and down to previous mode
- `help`: Description of the interactive help system
- `revert`: Revert changes
- `service`: Service Commands
- `show`: Show running system information
- `write`: Write running configuration to memory or terminal
The following table summarizes crypto map configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>crypto-map auto-vpn-tunnel/remote-vpn-client instance</td>
<td>Configures an auto site-to-site VPN or remote VPN client</td>
<td>page 7-103</td>
</tr>
<tr>
<td>crypto-map ipsec-manual-instance</td>
<td>Configures a manual site-to-site VPN</td>
<td>page 7-117</td>
</tr>
</tbody>
</table>
7.1.17.5.1 crypto-map auto-vpn-tunnel/remote-vpn-client instance

**crypto-map-config-commands**

To navigate to the auto site-to-site VPN tunnel configuration instance, use the following command:

In the device-config mode:

```
<DEVICE>(config-device-<DEVICE-MAC>)#crypto map <CRYPTO-MAP-TAG> <1-1000> ipsec-isakmp
```

In the profile-config mode:

```
<DEVICE>(config-profile-<PROFILE-NAME>)#crypto map <CRYPTO-MAP-TAG> <1-1000> ipsec-isakmp
```

```rfs4000-229D58(config-device-00-23-68-22-9D-58)#crypto map test 1 ipsec-isakmp
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#?
```

Site to Site Crypto Map Configuration commands:

- **ip** Internet Protocol config commands
- **local-endpoint-ip** Use this IP as local tunnel endpoint address, instead of the interface IP (Advanced Configuration)
- **no** Negate a command or set its defaults
- **peer** Add a remote peer
- **pfs** Specify Perfect Forward Secrecy
- **security-association** Security association parameters
- **transform-set** Specify IPSec transform to use
- **use** Set setting to use

```rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#
```

**crypto-map-config-commands**

To navigate to the remote VPN client configuration instance, use the following command:

In the device-config mode:

```
<DEVICE>(config-device-<DEVICE-MAC>)#crypto map <CRYPTO-MAP-TAG> <1-1000> ipsec-isakmp {dynamic}
```

In the profile-config mode:

```
<DEVICE>(config-profile-<PROFILE-NAME>)#crypto map <CRYPTO-MAP-TAG> <1-1000> ipsec-isakmp {dynamic}
```

```rfs4000-229D58(config-device-00-23-68-22-9D-58)#crypto map test 2 ipsec-isakmp dynamic
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#?
```

Dynamic Crypto Map Configuration commands:

- **local-endpoint-ip** Use this IP as local tunnel endpoint address, instead of the interface IP (Advanced Configuration)
- **modeconfig** Set the mode config method
- **no** Negate a command or set its defaults
- **peer** Add a remote peer
- **pfs** Specify Perfect Forward Secrecy
- **remote-type** Set the remote VPN client type
- **security-association** Security association parameters
- **transform-set** Specify IPSec transform to use
- **use** Set setting to use

```rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#
```
The following table lists the IPSec-Auto-VPN/Remote-VPN tunnel configuration commands:

**Table 7.9 IPSec-Auto-VPN/Remote-VPN Tunnel Config Mode Commands:**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip</td>
<td>Enables this setting to utilize IP/Port NAT on the VPN tunnel. This command is applicable only to the site-to-site VPN tunnel.</td>
<td>page 7-105</td>
</tr>
<tr>
<td>local-endpoint-ip</td>
<td>Uses the configured IP as local tunnel endpoint address, instead of the interface IP. This command is applicable to the site-to-site VPN tunnel and remote VPN client.</td>
<td>page 7-106</td>
</tr>
<tr>
<td>modeconfig</td>
<td>Configures the mode config method (pull or push) associated with the remote VPN client. This command is applicable only to the remote VPN client.</td>
<td>page 7-107</td>
</tr>
<tr>
<td>peer</td>
<td>Configures the IKEv1 or IKEv2 peer for the VPN tunnel. This command is applicable to the site-to-site VPN tunnel and remote VPN client.</td>
<td>page 7-108</td>
</tr>
<tr>
<td>pfs</td>
<td>Configures the <em>Perfect Forward Secrecy</em> (PFS) for the VPN tunnel. This command is applicable to the site-to-site VPN tunnel and remote VPN client.</td>
<td>page 7-109</td>
</tr>
<tr>
<td>remote-type</td>
<td>Configures the remote VPN client type as either None or XAuth. This command is applicable only to the remote VPN client.</td>
<td>page 7-110</td>
</tr>
<tr>
<td>security-association</td>
<td>Defines this automatic VPN tunnel’s IPSec SA settings. This command is applicable to the site-to-site VPN tunnel and remote VPN client.</td>
<td>page 7-111</td>
</tr>
<tr>
<td>transform-set</td>
<td>Applies a transform set (encryption and hash algorithms) to the VPN tunnel. This command is applicable to the site-to-site VPN tunnel and remote VPN client.</td>
<td>page 7-113</td>
</tr>
<tr>
<td>use</td>
<td>Applies an existing and configured IP access list to the VPN tunnel. This command is applicable to the site-to-site VPN tunnel and remote VPN client.</td>
<td>page 7-114</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts site-to-site VPN tunnel or remote VPN client settings</td>
<td>page 7-115</td>
</tr>
</tbody>
</table>
7.1.17.5.2 \textit{ip}

\textit{crypto-map auto-vpn-tunnel/remote-vpn-client instance}

Enables this setting to utilize IP/Port NAT on this auto site-to-site VPN tunnel. This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

\texttt{ip nat crypto}

Parameters

- \texttt{ip nat crypto}

| \texttt{ip nat crypto} | Enables this setting to utilize IP/Port NAT on the site-to-site VPN tunnel. This setting is disabled by default. |

Examples

\begin{verbatim}
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#ip nat crypto
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#show context crypto map test 1 ipsec-isakmp
  \textbf{ip nat crypto}
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#
\end{verbatim}
7.17.5.3 local-endpoint-ip

- *crypto-map auto-vpn-tunnel/remote-vpn-client instance*

Uses the configured IP as local tunnel endpoint address, instead of the interface IP

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`local-endpoint-ip <IP>`

**Parameters**

- `local-endpoint-ip <IP>`

<table>
<thead>
<tr>
<th>local-endpoint-ip &lt;IP&gt;</th>
<th>Configures the local VPN tunnel's (site-to-site VPN tunnel or remote VPN client) endpoint IP address</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP&gt;</td>
<td>Specify the IP address. The specified IP address must be available on the interface.</td>
</tr>
</tbody>
</table>

**Examples**

**Site-to-site VPN tunnel:**

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#local-endpoint-ip 192.168.13.10
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#show context crypto map test 1 ipsec-isakmp
  local-endpoint-ip 192.168.13.10
  ip nat crypto
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#
```

**Remote VPN client:**

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#local-endpoint-ip 157.235.204.62
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#show context crypto map test 2 ipsec-isakmp dynamic
  local-endpoint-ip 157.235.204.62
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#
```
7.1.17.5.4 modeconfig

- **crypto-map auto-vpn-tunnel/remote-vpn-client instance**

Configures the mode config method (pull or push) associated with the remote VPN client.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

modeconfig [pull|push]

**Parameters**

- modeconfig [pull|push]

| modeconfig [pull|push] | Configures the mode config method associated with a remote VPN client. The options are: pull and push. The mode (pull or push) defines the method used to assign a virtual IP. This setting is relevant for IKEv1 only, since IKEv2 always uses the configuration payload in pull mode. The default setting is push. |

**Examples**

Remote VPN client:

```bash
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#modeconfig pull
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#show context
crypto map test 2 ipsec-isakmp dynamic
   modeconfig pull
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)
```
7.17.5.5 peer

**crypto-map auto-vpn-tunnel/remote-vpn-client instance**

Configures the IKEV1 or IKEV2 peer for the auto site-to-site VPN tunnel or remote VPN client. The peer device can be specified either by its hostname or by its IP address. A maximum of three peers can be configured.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
peer <1-3> [ikev1|ikev2] <IKEV1/IKEV2-PEER-NAME>
```

**Parameters**

- `peer <1-3> [ikev1|ikev2] <IKEV1/IKEV2-PEER-NAME>`
  - `peer <1-3>` Creates a new peer and configures the peer’s priority level. Peer ‘1’ is the primary peer, and peer ‘3’ is redundant.
  - `ikev1 <IKEV1-PEER-NAME>` Configures an IKEV1 peer
    - `<IKEV1-PEER-NAME>` – Specify the IKEV1 peer’s name.
  - `ikev2 <IKEV2-PEER-NAME>` Configures an IKEV2 peer
    - `<IKEV2-PEER-NAME>` – Specify the IKEV2 peer’s name.

**Examples**

**Site-to-site tunnel:**

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#peer 1 ikev2 ikev2Peer1

rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#show context crypto map test 1 ipsec-isakmp
peer 1 ikev2 ikev2Peer1
local-endpoint-ip 192.168.13.10
ip nat crypto
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#
```

**Remote VPN client:**

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#peer 1 ikev1 RemoteIKEV1Peer1

rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#show context crypto map test 2 ipsec-isakmp dynamic
peer 1 ikev1 RemoteIKEV1Peer1
local-endpoint-ip 157.235.204.62
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#
```
7.17.5.6 pfs

crypto-map auto-vpn-tunnel/remote-vpn-client instance

Configures Perfect Forward Secrecy (PFS) for the auto site-to-site VPN tunnel or remote VPN client. PFS is the key-establishment protocol, used to secure VPN communications. If one encryption key is compromised, only data encrypted by that specific key is compromised. For PFS to exist, the key used to protect data transmissions must not be used to derive any additional keys. Options include 2, 5 and 14. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
pfs [14|2|5]
```

Parameters

```
• pfs [14|2|5]
```

| pfs [14|2|5] | Configures PFS |
|-------------|----------------|
| 14 – Configures D-H Group14 (2048-bit modp) |
| 2 – Configures D-H Group2 (1024-bit modp) |
| 5 – Configures D-H Group5 (1536-bit modp) |

Examples

**Site-to-site VPN tunnel:**
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#pfs 5
```
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#show context crypto map test 1 ipsec-isakmp peer 1 ikev2 ikev2Peer1 local-endpoint-ip 192.168.13.10 pfs 5 ip nat crypto
```
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#
```

**Remote VPN client:**
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#pfs 14
```
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#show context crypto map test 2 ipsec-isakmp dynamic peer 1 ikev1 RemoteIKEv1Peer1 local-endpoint-ip 157.235.204.62 pfs 14
```
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#
```

```
7.1.17.5.7 remote-type

crypto-map auto-vpn-tunnel/remote-vpn-client instance

Configures the remote VPN client type as either None or XAuth

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
remote-type [none|xauth]

Parameters
- remote-type [none|xauth]

remote-type [none|xauth]
<table>
<thead>
<tr>
<th>Specify the remote VPN’s client type</th>
</tr>
</thead>
<tbody>
<tr>
<td>none – Configures remote VPN client with No XAUTH</td>
</tr>
<tr>
<td>xauth – Configures remote VPN client as using XAUTH (applicable only for IKEv1). This is the default setting.</td>
</tr>
</tbody>
</table>

Note: XAuth (extended authentication) provides additional authentication validation by permitting an edge device to request extended authentication information from an IPSec host. This forces the host to respond with additional authentication credentials. The edge device respond with a failed or passed message.

Examples
Remote VPN client:
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#remote-type none
```
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#show context crypto map test 2 ipsec-isakmp dynamic peer 1 ikev1 RemoteIKEv1Peer1 local-endpoint-ip 157.235.204.62 pfs 14 remote-type none
```
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#
```
### 7.1.17.5.8 security-association

**crypto-map auto-vpn-tunnel/remote-vpn-client instance**

Defines the IPSec SA’s (created by this auto site-to-site VPN tunnel or remote VPN client) settings

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
security-association [inactivity-timeout|level|lifetime]
security-association [inactivity-timeout <120-86400>|level perhost]
security-association lifetime [kilobytes <500-2147483646>|seconds <120-86400>]
```

**Parameters**

- **security-association [inactivity-timeout <120-86400>|level perhost]**
  - **inactivity-timeout <120-86400>**
    - Specifies an inactivity period, in seconds, for this IPSec VPN SA. Once the set value is exceeded, the association is timed out.
    - `<120-86400>` – Specify a value from 120 - 86400 seconds. The default is 900 seconds.
  - **level perhost**
    - Specifies the granularity level for this IPSec VPN SA
      - `perhost` – Sets the IPSec VPN SA’s granularity to the host level

- **security-association lifetime [kilobytes <500-2147483646>|seconds <120-86400>]**
  - **lifetime [kilobytes <500-2147483646>|seconds <120-86400>]**
    - Defines the IPSec SA’s lifetime (in kilobytes and/or seconds). Values can be entered in both kilobytes and seconds. Which ever limit is reached first, ends the security association.
      - `kilobytes <500-2147483646>` – Defines volume based key duration. Specify a value from 500 - 2147483646 kilobytes. Select this option to define a connection volume lifetime (in kilobytes) for the duration of the IPSec VPN SA. Once the set volume is exceeded, the association is timed out. This option is disabled by default.
      - `seconds <120-86400>` – Defines time based key duration. Specify the time frame from 120 - 86400 seconds. Select this option to define a lifetime (in seconds) for the duration of the IPSec VPN SA. Once the set value is exceeded, the association is timed out. This option is disabled by default.

**Examples**

**Site-to-site tunnel:**

```
rfs4000-229D58 (config-device-00-23-68-22-9D-58-cryptomap-test#1)#security-association inactivity-timeout 200
```

```
rfs4000-229D58 (config-device-00-23-68-22-9D-58-cryptomap-test#1)#security-association level perhost
```

```
rfs4000-229D58 (config-device-00-23-68-22-9D-58-cryptomap-test#1)#security-association lifetime kilobytes 250000
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#show context
crypto map test 1 ipsec-isakmp
  security-association level perhost
  peer 1 ikev2 ikev2Peer1
  local-endpoint-ip 192.168.13.10
  pfs 5
  security-association lifetime kilobytes 250000
  security-association inactivity-timeout 200
  ip nat crypto
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#

Remote VPN client:

rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#security-association lifetime seconds 10000
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#show context
crypto map test 2 ipsec-isakmp dynamic
  peer 1 ikev1 RemoteIKEv1Peer1
  local-endpoint-ip 157.235.204.62
  pfs 14
  security-association lifetime seconds 10000
  remote-type none
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#
7.1.17.5.9 transform-set

crypto-map auto-vpn-tunnel/remote-vpn-client instance

Applies a transform set (encryption and hash algorithms) to site-to-site VPN tunnel or remote VPN client. This command allows you to provide customized data protection for each crypto map can be customized with its own data protection and peer authentication schemes.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

transform-set <TRANSFORM-SET-TAG> {<TRANSFORM-SET-TAG>}

Parameters

- transform-set <TRANSFORM-SET-TAG> {<TRANSFORM-SET-TAG>}

<table>
<thead>
<tr>
<th>transform-set &lt;TRANSFORM-SET-TAG&gt;</th>
<th>&lt;TRANSFORM-SET-TAG&gt;</th>
<th>Applies a transform set. The transform set should be existing and configured.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;TRANSFORM-SET-TAG&gt;</td>
<td>&lt;TRANSFORM-SET-TAG&gt;</td>
<td>• &lt;TRANSFORM-SET-TAG&gt; – Specify the transform set's name.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• &lt;TRANSFORM-SET-TAG&gt; – Optional. Specify a second transform set. You can provide multiple, space-separated, transform set tags.</td>
</tr>
</tbody>
</table>

Examples

Site-to-site VPN tunnel:

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#transform-set AutoVPN
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#show context
crypto map test 1 ipsec-isakmp
  security-association level perhost
  peer 1 ikev2 ikev2Peer1
  local-endpoint-ip 192.168.13.10
  pfs 5
  security-association lifetime kilobytes 250000
  security-association inactivity-timeout 200
  transform-set AutoVPN
  ip nat crypto
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#
```

Remote VPN client:

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#transform-set RemoteVPN
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#show context
crypto map test 2 ipsec-isakmp dynamic
  peer 1 ikev1 RemoteIKEv1Peer1
  local-endpoint-ip 157.235.204.62
  pfs 14
  security-association lifetime seconds 10000
  transform-set RemoteVPN
  remote-type none
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#
```
7.1.17.5.10 use

Applies an existing and configured IP access list to the auto site-to-site VPN tunnel or remote VPN client. Based on the IP access list's settings traffic is permitted or denied across the VPN tunnel.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

use ip-access-list <IP-ACCESS-LIST-NAME>

Parameters

- use ip-access-list <IP-ACCESS-LIST-NAME>

Examples

Site-to-site VPN tunnel:

rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#use ip-access-list test
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#show context
crypto map test1 ipsec-isakmp
use ip-access-list test
security-association level perhost
peer 1 ikev2 ikev2Peer1
local-endpoint-ip 192.168.13.10
pfs 5
security-association lifetime kilobytes 250000
security-association inactivity-timeout 200
transform-set AutoVPN
ip nat crypto
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#

Remote VPN client:

rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#use ip-access-list test1
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#show context
crypto map test2 ipsec-isakmp dynamic
use ip-access-list test1
peer 1 ikev1 RemoteIKEv1Peer1
local-endpoint-ip 157.235.204.62
pfs 14
security-association lifetime seconds 10000
transform-set RemoteVPN
remote-type none
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#
7.1.17.5.11 no

- crypto-map auto-vpn-tunnel/remote-vpn-client instance

Removes or reverts the auto site-to-site VPN tunnel or remote VPN client settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [ip|local-endpoint-ip|modeconfig|peer|pfs|remote-type|security-association|transform-set|use]

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes or resets this auto site-to-site/remote VPN settings based on the parameters passed |

Examples

The following example shows the IPSec site-to-site VPN tunnel ‘test’ settings before the ‘no’ commands are executed:

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#show context
crypto map test 1 ipsec-isakmp
  use ip-access-list test
  security-association level perhost
  peer 1 ikev2 ikev2Peer1
  local-endpoint-ip 192.168.13.10
  pfs 5
  security-association lifetime kilobytes 250000
  security-association inactivity-timeout 200
  transform-set AutoVPN
ip nat crypto
```

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#
```

The following example shows the IPSec site-to-site VPN tunnel ‘test’ settings after the ‘no’ commands are executed:

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#show context
crypto map test 1 ipsec-isakmp
  peer 1 ikev2 ikev2Peer1
  security-association lifetime kilobytes 250000
  security-association inactivity-timeout 200
  transform-set AutoVPN
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)##
```
The following example shows the IPSec remote VPN client 'test' settings before the 'no' commands are executed:

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#show context
crypto map test 2 ipsec-isakmp dynamic
   use ip-access-list test2
   peer 1 ikev1 RemoteIKEv1Peer1
   local-endpoint-ip 157.235.204.62
   pfs 14
   security-association lifetime seconds 10000
   transform-set RemoteVPN
   remote-type none
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#
```

The following example shows the IPSec remote VPN client 'test' settings after the 'no' commands are executed:

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#no use ip-access-list
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#no peer 1
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#no transform-set
```

The following example shows the IPSec remote VPN client 'test' settings after the 'no' commands are executed:

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#show context
crypto map test 2 ipsec-isakmp dynamic
   local-endpoint-ip 157.235.204.62
   pfs 14
   security-association lifetime seconds 10000
   remote-type none
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#
```
7.1.17.5.12 crypto-map-ipsec-manual-instance

crypto-map-config-commands

To navigate to the automatic IPSec manual VPN tunnel configuration instance, use the following command:
In the device-config mode:

<DEVICE>(config-device-<DEVICE-MAC>)#crypto map <CRYPTO-MAP-TAG> <1-1000> ipsec-manual

In the profile-config mode:

<DEVICE>(config-profile-<PROFILE-NAME>)#crypto map <CRYPTO-MAP-TAG> <1-1000> ipsec-manual

rfs4000-229D58(config-device-00-23-68-22-9D-58)#crypto map test 3 ipsec-manual
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#3)#?

Manual Crypto Map Configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>local-endpoint-ip</td>
<td>Use this IP as local tunnel endpoint address, instead of the interface IP (Advanced Configuration)</td>
<td>page 7-118</td>
</tr>
<tr>
<td>mode</td>
<td>Sets the tunnel mode</td>
<td>page 7-119</td>
</tr>
<tr>
<td>peer</td>
<td>Sets the peer device’s IP address</td>
<td>page 7-120</td>
</tr>
<tr>
<td>security-association</td>
<td>Defines the lifetime (in kilobytes and/or seconds) of IPSec SAs created by a crypto map</td>
<td>page 7-121</td>
</tr>
<tr>
<td>session-key</td>
<td>Defines encryption and authentication keys for a crypto map</td>
<td>page 7-122</td>
</tr>
<tr>
<td>use</td>
<td>Uses the configured IP access list</td>
<td>page 7-124</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts crypto map IPSec manual settings</td>
<td>page 7-125</td>
</tr>
</tbody>
</table>

The following table summarizes IPSec manual VPN tunnel configuration mode commands:

Table 7.10 IPSec Manual VPN Tunnel Config Mode Commands
7.1.17.5.13 local-endpoint-ip

*crypto-map-ipsec-manual-instance*

Uses the configured IP as local tunnel endpoint address, instead of the interface IP (Advanced Configuration)

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`local-endpoint-ip <IP>`

**Parameters**

- `local-endpoint-ip <IP>`

<table>
<thead>
<tr>
<th>local-endpoint-ip &lt;IP&gt;</th>
<th>Uses the configured IP as local tunnel’s endpoint address</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP&gt;</td>
<td>- &lt;IP&gt; – Specify the IP address. The specified IP address must be available on the interface.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#local-endpoint-ip 172.16.10.3
```
7.1.17.5.14 mode

Sets the crypto map tunnel mode

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
mode [transport|tunnel]

Parameters
- mode [transport|tunnel]

| mode [transport|tunnel] | Sets the mode of the tunnel for this crypto map |
|------------------------|-----------------------------------------------|
| transport              | transport – Initiates transport mode          |
| tunnel                 | tunnel – Initiates tunnel mode (default setting) |

Examples
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#mode transport
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#show context crypto map map1 1 ipsec-manual
  mode transport
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#
7.1.17.5.15 peer

Sets the peer device’s IP address. This can be set for multiple remote peers. The remote peer can be an IP address.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
peer <IP>

Parameters
- peer <IP>

Examples
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#peer 172.16.10.12
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#show context
crypto map map1 1 ipsec-manual
   peer 172.16.10.12
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#
7.1.17.5.16 security-association

crypto-map-ipsec-manual-instance

Defines the lifetime (in kilobytes and/or seconds) of IPSec SAs created by this crypto map

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

security-association lifetime [kilobytes <500-2147483646>|seconds <120-86400>]

Parameters

- security-association lifetime [kilobytes <500-2147483646>|seconds <120-86400>]

<table>
<thead>
<tr>
<th>lifetime values</th>
<th>Values can be entered in both kilobytes and seconds. Which ever limit is reached first, ends the security association.</th>
</tr>
</thead>
<tbody>
<tr>
<td>kilobytes</td>
<td>• kilobytes &lt;500-2147483646&gt; – Defines volume based key duration. Specify a value from 500 - 2147483646 bytes.</td>
</tr>
<tr>
<td>seconds</td>
<td>• seconds &lt;120-86400&gt; – Defines time based key duration. Specify the time frame from 120 - 86400 seconds.</td>
</tr>
</tbody>
</table>

NOTE: This command is not applicable to the ipsec-manual crypto map.

Examples

rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map2#2)#security-association lifetime seconds 123

rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map2#2)#show context Command not applicable to this crypto map

rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map2#2)#
### 7.1.17.5.17 session-key

**crypto-map-ipsec-manual-instance**

Defines encryption and authentication keys for this crypto map

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7510, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
session-key [inbound|outbound] [ah|esp] <256-4294967295>
session-key [inbound|outbound] ah <256-4294967295> [0|2|authenticator [md5|sha]] <WORD>
session-key [inbound|outbound] esp <256-4294967295> [0|2|cipher [3des|aes|aes-192|aes-256|des|esp-null]] <WORD> authenticator [md5|sha] <WORD>
```

**Parameters**

- **session-key [inbound|outbound] ah <256-4294967295> [0|2|authenticator [md5|sha]] <WORD>**

| session-key [inbound|outbound] | Defines the manual inbound and outbound security association key parameters |
|-------------------------------|----------------------------------------------------------------------------------|
| ah <256-4294967295>           | Configures authentication header (AH) as the security protocol for the security session. |
|                               | - <256-4294967295> – Sets the SPI for the security association from 256 - 4294967295 |
|                               | The SPI (in combination with the destination IP address and security protocol) identifies the security association. |

| [0|2|authenticator [md5|sha] <WORD> | Specifies the key type |
|-----------------------------------|------------------------|
| 0 – Sets a clear text key         |                        |
| 2 – Sets an encrypted key         |                        |
| authenticator – Sets AH authenticator details |                        |
| md5 <WORD> – AH with MD5 authentication |                        |
| sha <WORD> – AH with SHA authentication |                        |
| <WORD> – Sets security association key value. The following key lengths (in hex characters) are required (w/o leading 0x).AH-MD5: 32, AH-SHA: 40 |                        |

- **session-key [inbound|outbound] esp <256-4294967295> [0|2|cipher [3des|aes|aes-192|aes-256|des|esp-null]] <WORD> authenticator [md5|sha] <WORD>**

| session-key [inbound|outbound] | Defines the manual inbound and outbound security association key parameters |
|-------------------------------|----------------------------------------------------------------------------------|
| esp <256-4294967295>          | Configures Encapsulating Security Payloads (ESP) as the security protocol for the security session. This is the default setting. |
|                               | - <256-4294967295> – Sets the SPI for the security association from 256 - 4294967295 |
|                               | The SPI (in combination with the destination IP address and security protocol) identifies the security association. |
Examples

```
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#session-key inbound esp 273 cipher esp-null authenticator sha 58768979
```

```
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#show context
crypto map map1 1 ipsec-manual
  peer 172.16.10.2
  mode transport
  session-key inbound esp 273 0 cipher esp-null authenticator sha 58768979
```

```
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#
```
7.1.17.5.18 use

crypto-map-ipsec-manual-instance

Associates an existing IP access list with this crypto map. The ACL protects the VPN traffic.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
use ip-access-list <IP-ACCESS-LIST-NAME>

Parameters
- use ip-access-list <IP-ACCESS-LIST-NAME>

<table>
<thead>
<tr>
<th>ip-access-list &lt;IP-ACCESS-LIST-NAME&gt;</th>
<th>Specify the IP access list name.</th>
</tr>
</thead>
</table>

Examples
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#use ip-access-list test
crypto-map-map1 1 ipsec-manual
  use ip-access-list test
  peer 172.16.10.12
  mode transport
  session-key inbound esp 273 0 cipher esp-null authenticator sha 5876897
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#
7.1.17.5.19 no

Removes or resets this crypto map's settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6523, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [local-endpoint-ip|mode|peer|security-association|session-key|use]

Parameters

- no <PARAMETERS>

no <PARAMETERS> Removes or resets this crypto map settings based on the parameters passed

Examples

rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#show context
crypto map map1 1 ipsec-manual
  use ip-access-list test
  peer 172.16.10.12
  mode transport
  session-key inbound esp 273 0 cipher esp-null authenticator sha 58768979
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#

rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#no use ip-access-list
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#no peer
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#no mode

rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#show context
crypto map map1 1 ipsec-manual
  session-key inbound esp 273 0 cipher esp-null authenticator sha 58768979
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#
7.1.17.6 crypto-remote-vpn-client commands

This section documents the IKEV2 remote VPN client configuration settings. Use this command to define the server resources used to secure (authenticate) a remote VPN connection with a target peer.

Use the profile-confi instance to configure remote VPN client settings. To navigate to the remote-vpn-client configuration instance, use the following commands:

```
<DEVICE>(config)#profile <DEVICE-TYPE> <PROFILE-NAME>
<DEVICE>(config-profile-<PROFILE-NAME>)#crypto remote-vpn-client
<DEVICE>(config-profile-<PROFILE-NAME>-crypto-ikev2-remote-vpn-client)#
```

**NOTE:** To configure remote VPN client settings on a device, on the device's configuration mode, use the `crypto > remote-vpn-client` command.

For example:

```
rf4000-229D58(config-device-00-23-68-22-9D-58)#crypto remote-vpn-client
```

**NOTE:** The following configuration enables a access point to adopt to a controller over the remote VPN link:

On a profile:

```
rf4000-229D58(config-profile-testRFS4000)#controller host <HOST-IP> remote-vpn-client
```

On a device:

```
rf4000-229D58(config-00-23-68-22-9D-58)#controller host <HOST-IP> remote-vpn-client
```

Crypto IKEV2 Remote Vpn Client Config commands:

- `dhcp-peer` Configure parameters for peers received via DHCP option
- `no` Negate a command or set its defaults
- `peer` Add a remote peer
- `shutdown` Disable remote vpn client
- `transform-set` Specify IPSec transform to use
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

The following table summarizes crypto remote VPN client configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>dhcp-peer</code></td>
<td>Configures DHCP peer’s local ID and authentication settings</td>
<td>page 7-128</td>
</tr>
<tr>
<td><code>peer</code></td>
<td>Adds a remote IKEv2 peer</td>
<td>page 7-129</td>
</tr>
<tr>
<td><code>shutdown</code></td>
<td>Disables the remote VPN client</td>
<td>page 7-130</td>
</tr>
</tbody>
</table>
### Table 7.11  Crypto Remote VPN Client Config Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>transform-set</td>
<td>Associates an existing IPSec transform set with this remote VPN client</td>
<td>page 7-131</td>
</tr>
<tr>
<td>no</td>
<td>Removes the remote VPN client settings</td>
<td>page 7-132</td>
</tr>
</tbody>
</table>
7.1.17.6.1 dhcp-peer

Configure crypto-remote-vpn-client commands

Configures DHCP peer's local ID and authentication settings

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dhcp-peer [authentication|localid]
dhcp-peer authentication [psk [0 <WORD>|2 <WORD>|<WORD>]|rsa]
dhcp-peer localid [autogen-uniqueid <WORD>|string <WORD>]

Parameters
- dhcp-peer authentication [psk [0 <WORD>|2 <WORD>|<WORD>]|rsa]
  - Configures the DHCP peer’s authentication type as PSK
    - 0 <WORD> – Configures a clear text authentication key
    - 2 <WORD> – Configures an encrypted authentication key
    - <WORD> – Provide a 8 - 21 character shared key password for DHCP peer authentication
- dhcp-peer localid [autogen-uniqueid <WORD>|string <WORD>]
  - Configures the DHCP peer's localid using one of the following options:
    - autogen-uniqueid - Generates a localid using the device's unique identity. The system prefixes the device's unique identity to the string provided here. The device's unique identity should be existing and configured. For more information on configuring a device's unique identity, see autogen-uniqueid.
    - <WORD> – Provide the string.
    - string - Uses the value provided here as the DHCP peer’s localid.
    - <WORD> - Provide the string.

Examples
rfs4000-229D58 (config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#dhcp-peer authentication psk 0 @123testing
rfs4000-229D58 (config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#show context crypto remote-vpn-client
dhcp-peer authentication psk 0 @123testing
rfs4000-229D58 (config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#
7.17.6.2 peer

**crypto-remote-vpn-client commands**

Configures IKEv2 peers and assigns them priorities for utilization with remote VPN client connections. A maximum of three (3) peers can be added to support redundancy.

IKEv2 uses an initial handshake in which VPN peers negotiate cryptographic algorithms, mutually authenticate, and establish a session key, creating an IKE-SA. Additionally, a first IPSec SA is established during the initial SA creation. All IKEv2 messages are request/response pairs. It is the responsibility of the side sending the request to retransmit if it does not receive a timely response.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
peer <1-3> ikev2 <IKEV2-PEER-NAME>
```

**Parameters**

- **<IKEV2-PEER-NAME>**
  - **Note:** The peer should be existing and configured. To configure an IKEv2 peer use the `crypto > ikev2 > peer > <IKEV2-PEER-NAME>` command.

**Examples**

```
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#peer 1 ikev2 ikev2Peer1
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#peer 2 ikev2 ikev2Peer2
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#show context crypto remote-vpn-client
peer 1 ikev2 ikev2Peer1
peer 2 ikev2 ikev2Peer2
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#
```
7.1.17.6.3 shutdown

* crypto-remote-vpn-client commands

Disables remote-vpn-client on this profile or device. Remote VPN client feature is enabled by default. To enable a disabled remote VPN client execute the *no > shutdown* command.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
shutdown
```

**Parameters**

None

**Examples**

```
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)# shutdown
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#
```
7.1.17.6.4 transform-set

crypto-remote-vpn-client commands

Transforms the IPSec Transform set to use with this remote VPN client. A transform set is a combination of security protocols, algorithms, and other settings applied to IPSec protected client traffic.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
transform-set <IPSEC-XFORM-TAG> {<IPSEC-XFORM-TAG>}</IPSEC-XFORM-TAG>

Parameters
- transform-set <IPSEC-XFORM-TAG> {<IPSEC-XFORM-TAG>}</IPSEC-XFORM-TAG>

<table>
<thead>
<tr>
<th>transform-set</th>
<th>Associates an IPSec Transform (should be existing and configured) set with this remote VPN client. You can optionally associate more than one transform set with this remote VPN client configuration. List the transform set tags separated by a space.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note:</td>
<td>To configure a transform-set, use the crypto &gt; ipsec &gt; transform-set command in the profile or device configuration mode.</td>
</tr>
</tbody>
</table>

Examples
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#transform-set TransformSet1
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#show context
crypto remote-vpn-client
  peer 1 ikev2 ikev2Peer1
  transform-set TransformSet1
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#
7.1.17.6.5 no

*crypto-remote-vpn-client commands*

Removes the remote VPN client settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

- no [dhcp-peer|peer <1-3>|shutdown|transform-set]
- no dhcp-peer [authentication|localid]
- no peer <1-3>
- no shutdown
- no transform-set

**Parameters**

- no <PARAMETERS>

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes or resets this remote VPN client settings based on the parameters passed</th>
</tr>
</thead>
</table>

**Examples**

```bash
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#show context crypto remote-vpn-client
peer 1 ikev2 peer5
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#

rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#no peer 1

rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#show context crypto remote-vpn-client
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#
```
### 7.1.18 database

**Profile Config Commands**

Backs up captive-portal and/or NSight database to a specified location and file. When applied to devices, this profile will enable the back up of the specified database. This command also enables you to configure a low-disk-space threshold value.

These parameters can also be configured in the device configuration context of an NX9XXX series service platform.

Supported in the following platforms:
- Service Platforms — NX9000, NX9500, NX9510, NX9600

#### Syntax

```
database [backup|low-disk-space-threshold]
```

```
database backup database [captive-portal|nsight] <URL>
database low-disk-space-threshold <10-50>
```

#### Parameters

- **database backup database [captive-portal|nsight] <URL>**
  - `database` — Selects the database to backup
  - `captive-portal` — Backs up captive portal database
  - `nsight` — Backs up NSight database

  After specifying the database type, configure the destination location and file name.

- **<URL>**
  - Configures the destination location. The database is backed up at the specified location. Specify the location URL in one of the following formats:
  - `ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file.tar.gz`
  - `sftp://<user>:<passwd>@<hostname|IP>[:port]/path/file.tar.gz`
  - `tftp://<hostname|IP>[:port]/path`

- **database low-disk-space-threshold <10-50>**
  - Configures the low disk space threshold for syslog warning. Once the threshold value configured here is reached a syslog warning is sent.
    - `<10-50>` — Specify the threshold from 10 - 50. The default is 30.

#### Examples

```
nx9500-6C8809(config-profile-testNX9000)#database backup database nsight ftp://anonymous:anonymous@192.168.13.10/backups/nsight/nsight.tar.gz
```

**Related Commands**

- **no**
  - Removes database backup configurations
7.1.19 **device-upgrade**

*Profile Config Commands*

Configures device firmware upgrade settings on this profile

Administrators can customize profiles with unique device configuration file and firmware upgrade support. In a clustered environment, operations performed on one device are propagated to each member of the cluster and then onwards to devices managed by each cluster member. The number of concurrent device upgrades and their start times can be customized to ensure a sufficient number of devices remain in duty while upgrades are administered to others.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
device-upgrade [add-auto|auto|count|persist-images]
```

```
device-upgrade add-auto 
   [(ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap832|ap8533|rfs4000|rfs6000|rfs7000)
   ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap832|ap8533|rfs4000|rfs6000|rfs7000]
```

```
device-upgrade auto 
   {(ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap832|ap8533|rfs4000|rfs6000|rfs7000|
   nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600)}
```

```
device-upgrade count <1-128>
```

```
device-upgrade persist-images
```

**Parameters**

- **device-upgrade add-auto**

```
   [(ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap832|ap8533|rfs4000|rfs6000|rfs7000|
   ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap832|ap8533|rfs4000|rfs6000|rfs7000|
   nx45xx|nx5500|nx65xx|nx75xx|nx9000|nx9600)]
```

<table>
<thead>
<tr>
<th>device-upgrade</th>
<th>Configures a list of devices types for automatic firmware upgrade</th>
</tr>
</thead>
<tbody>
<tr>
<td>add-auto</td>
<td>This command specifies the types of devices that can be automatically upgraded (if enabled). To enable automatic device firmware upgrade, use the <code>auto</code> command. When enabled, access points, wireless controllers, and service platforms, using this profile, will automatically upgrade firmware on adopted devices that match the specified device types.</td>
</tr>
<tr>
<td>[ap621</td>
<td>ap622</td>
</tr>
</tbody>
</table>

**Note:** Multiple device types can be added to the add-auto list.

**Note:** The NX9600 option is available only on a NX9600 model service platform.
### device-upgrade auto

Sets the device types for automatic firmware upgrade. When used along with the add-auto command, the auto command allows access points, wireless controllers, and service platforms to automatically upgrade firmware on adopted devices matching the specified device types.

#### Syntax

```
{ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|
ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfa7000|nx45xx|
nx5500|nx65xx|nx75xx|nx9000|nx9600}
```

#### Examples

```
rfs4000-229D58(config-profile-default-rfs4000)#device-upgrade auto ap71xx
rfs4000-229D58(config-profile-default-rfs4000)#device-upgrade persist-ap-image
rfs4000-229D58(config-profile-default-rfs4000)#show context
```

#### Related Commands

- **no**
  - Removes device firmware upgrade settings on this profile
- **device-upgrade**
  - Displays device upgrade details

### device-upgrade count <1-128>

Sets the maximum number of concurrent upgrades possible.

#### Syntax

```
<1-128> – specify a value from 1 - 128. The default is 10.
```

### device-upgrade persist-images

Enables RF Domain manager to retain AP firmware image after upgrade, subject to availability of space. This option is enabled by default. This option is enabled for all controllers and service platforms RF Domain managers with the flash memory capacity to store firmware images for the selected access point models they provision. This feature is disabled for access point RF Domain managers that do not typically have the flash memory capacity needed.

```
rfs4000-229D58(config-profile-default-rfs4000)#device-upgrade persist-images
```

### Examples

```
rfs4000-229D58(config-profile-default-rfs4000)#device-upgrade auto ap71xx
rfs4000-229D58(config-profile-default-rfs4000)#show context
```

### Related Commands

- **no**
  - Removes device firmware upgrade settings on this profile
- **device-upgrade**
  - Displays device upgrade details
7.1.20 dot1x

Profile Config Commands

Configures 802.1x standard authentication controls

Dot1x (or 802.1x) is an IEEE standard for network authentication. It enables media-level (layer 2) access control, providing the capability to permit or deny connectivity based on user or device identity. Dot1x allows port-based access using authentication. An dot1x enabled port can be dynamically enabled or disabled depending on user identity or device connection.

Devices supporting dot1x allow the automatic provision and connection to the wireless network without launching a Web browser at login. When within range of a dot1x network, a device automatically connects and authenticates without needing to manually login.

Before authentication, the endpoint is unknown, and traffic is blocked. Upon authentication, the endpoint is known and traffic is allowed. The controller or service platform uses source MAC filtering to ensure only the authenticated endpoint is allowed to send traffic.

Supported in the following platforms:

• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dot1x [guest-vlan|holdtime|system-auth-control|use]
dot1x holdtime <0-600>
dot1x system-auth-control
dot1x guest-vlan supplicant
dot1x use aaa-policy <AAA-POLICY-NAME>

Parameters

• dot1x system-auth-control

  system-auth-control | Enables system auth control. Enables dot1x authorization globally for the controller. This feature is disabled by default.

• dot1x holdtime <0-600>

  holdtime <0-600> | Configures a holdtime value. This is the interval after which an authentication attempt is ignored or failed.
  • <0-600> – Specify a value from 0 - 600 seconds. A value of ‘0’ indicates no holdtime. The default is 600 seconds or 10 minutes.
  Adding a hold time at startup allows time for the network to converge before receiving or transmitting 802.1x authentication packets.

• dot1x guest-vlan supplicant

  guest-vlan | Configures guest VLAN and supplicant behavior
  This feature is disabled by default.

  supplicant | Allows 802.1x capable supplicant to enter guest VLAN. When enabled, this is the VLAN that supplicant's traffic is bridged on.
dot1x use aaa-policy <AAA-POLICY-NAME>

<table>
<thead>
<tr>
<th>use aaa-policy &lt;AAA-POLICY-NAME&gt;</th>
<th>Associates a specified 802.1x AAA policy (for MAC authentication) with this access point profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;AAA-POLICY-NAME&gt; – Specify the AAA policy name. Once specified, this AAA policy is utilized for authenticating user requests.</td>
</tr>
</tbody>
</table>

Examples

nx4500-5CFA2B(config-profile-testNX45XX)#dot1x use aaa-policy test

nx4500-5CFA2B(config-profile-testNX45XX)#dot1x system-auth-control

nx4500-5CFA2B(config-profile-testNX45XX)#show context profile nx45xx testNX45XX
  slot 1
  slot 2
  slot 3
  slot 4
  no autoinstall configuration
  no autoinstall firmware
  crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ikev1 peer peer1

ipv6 nd raguard
interface wwan1
interface pppoe1
use firewall-policy default
service pm sys-restart
router ospf
router bgp
dot1x system-auth-control
dot1x use aaa-policy test
service fast-switching

nx4500-5CFA2B(config-profile-testNX45XX)#

Related Commands

no | Disables or reverts settings to their default
### Profile Config Commands

Enables Deep Packet Inspection (DPI) on this profile or device.

DPI is an advanced packet filtering technique functioning at the application layer. Use DPI to find, identify, classify, reroute or block packets containing specific data or codes that other packet filtering techniques (examining only packet headers) cannot detect.

Enable DPI to scan data packets passing through the WiNG managed network. DPI inspects every byte of each application header packet passing through the controller or service platform, and logs, blocks, or routes the packets to their destination. The level of granularity that DPI provides in terms of packet inspection helps block the spread of viruses, illegal downloads, and prioritizes data transmitted by bandwidth-heavy applications (video and VoIP applications), resulting in reduced congestion and enhanced security within the WiNG managed network.

This command is also available in the device configuration mode.

Supported in the following platforms:

- Access Points — AP7522, AP7532
- Service Platforms — NX5500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

- `dpi {custom-app|logging|metadata}`
- `dpi {custom-app <CUSTOM-APP-NAME>}`
- `dpi {logging [level [<0-7>|alerts|critical|debugging|emergencies|errors|informational|notifications|warnings]|on]}`
- `dpi {metadata [http|ssl|voice-video]}`

### Parameters

- **dpi {custom-app <CUSTOM-APP-NAME>}**

  Enables DPI (application assurance) on this profile and configures DPI settings. When enabled, the system detects the Protocol and Application Classification Engine (PACE), a third-party DPI engine from IPOQUE, built-in applications. PACE has approximately 700 built-in applications that are grouped into twenty two (22) application categories. Use the ‘custom-app’ option to add applications not included in the PACE built-in list.

- **custom-app <CUSTOM-APP-NAME>**

  Optional. Adds custom application to this profile.
  - `<CUSTOM-APP-NAME>` — Specify custom application name (should be existing and configured).
  If no custom application is specified, the system detects the PACE built-in applications.

  **Note:** For more information on application categories and application detection, see [application](#).

- **dpi {logging [level [<0-7>|alerts|critical|debugging|emergencies|errors|informational|notifications|warnings]|on]}**

  Enables DPI (application assurance) on this profile and configures DPI settings. When enabled, the system detects PACE, a third-party DPI engine from IPOQUE, built-in applications. PACE has approximately 700 built-in applications that are grouped into twenty two (22) application categories. Use the ‘custom-app’ option to add applications not included in the PACE built-in list.
### dpi

Enables DPI (application assurance) on this profile and configures DPI settings

When enabled, the system detects the PACE, a third-party DPI engine from IPOQUE, built-in applications. PACE has approximately 700 built-in applications that are grouped into twenty two (22) application categories. Use the 'custom-app' option to add applications not included in the PACE built-in list.

### metadata [http|ssl|voice-video]

Optional. Enables metadata extraction of following data-type flows:

- **http** – HTTP application data flows. This option is disabled by default.
- **ssl** – SSL application data flows. This option is disabled by default.
- **voice-video** – high-bandwidth voice and video application data flows. This option is disabled by default.

### Examples

nx9500-6C8809(config-profile-testNX9000)#dpi logging on

nx9500-6C8809(config-profile-testNX9000)#dpi logging level 7

nx9500-6C8809(config-profile-testNX9000)#show context

### Related Commands

- **no**

  Disables DPI (application assurance) on this profile
### 7.1.22 dscp-mapping

#### Profile Config Commands

Configures IP *Differentiated Services Code Point* (DSCP) to 802.1p priority mapping for untagged frames

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

dscp-mapping <WORD> priority <0-7>

#### Parameters

- **dscp-mapping <word> priority <0-7>**

<table>
<thead>
<tr>
<th>&lt;WORD&gt;</th>
<th>Specifies the DSCP value of a received IP packet. This could be a single value or a list. For example, 10-20, 25, 30-35.</th>
</tr>
</thead>
<tbody>
<tr>
<td>priority &lt;0-7&gt;</td>
<td>Specifies the 802.1p priority to use for a packet if untagged. The priority is set on a scale of 0 - 7. The priority values are:</td>
</tr>
<tr>
<td></td>
<td>• 0 – Best effort</td>
</tr>
<tr>
<td></td>
<td>• 1 – Background</td>
</tr>
<tr>
<td></td>
<td>• 2 – Spare</td>
</tr>
<tr>
<td></td>
<td>• 3 – Excellent effort</td>
</tr>
<tr>
<td></td>
<td>• 4 – Controlled load</td>
</tr>
<tr>
<td></td>
<td>• 5 – Video</td>
</tr>
<tr>
<td></td>
<td>• 6 – Voice</td>
</tr>
<tr>
<td></td>
<td>• 7 – Network control</td>
</tr>
</tbody>
</table>

**Note:** The specified 802.1p priority value is added as a 3-bit IP precedence value in the *Type of Service* (ToS) field of the IP header used to set the priority. Up to 64 entries are permitted.

#### Examples

```
rfs7000-37FABE(config-profile-default-rfs7000)#dscp-mapping 20 priority 7
```

```
rfs7000-37FABE(config-profile-default-rfs7000)#show context profile rfs7000 default-rfs7000
dscp-mapping 20 priority 7
```

```
no autoinstall configuration
no autoinstall firmware
crypto isakmp policy default
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
interface mel
interface gel
ip dhcp trust
go trust dscp
rfs7000-37FABE(config-profile-default-rfs7000)#
```

#### Related Commands

| no | Disables or reverts settings to their default |
### 7.1.23 `email-notification`

**Profile Config Commands**

Configures e-mail notification settings. When a system event occurs e-mail notifications are sent (provided message logging is enabled) based on the settings configured here. Use this option to configure the outgoing SMTP server settings.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
email-notification [host|recipient]
email-notification recipient <RECIPIENT-NAME>
email-notification host <SMTP-SERVER-IP/HOSTNAME> sender <SENDER-EMAIL> [port|security|username]
email-notification host <SMTP-SERVER-IP/HOSTNAME> sender <SENDER-EMAIL> [port <1-65535>, security [none|ssl|starttls], username <SMTP-USERNAME> password [2 <WORD>|<WORD>]]
```

**Parameters**

- **recipient `<RECIPIENT-EMAIL>`**: Defines the recipient’s e-mail address. A maximum of 6 (six) e-mail addresses can be configured.
  - `<RECIPIENT-EMAIL>` – Specify the recipient's e-mail address (should not exceed 64 characters in length).

- **host `<SMTP-SERVER-IP/HOSTNAME>`**: Configures the host SMTP server's IP address or hostname.
  - `<SMTP-SERVER-IP/HOSTNAME>` – Specify the SMTP server’s IP address or hostname.

- **sender `<SENDER-EMAIL>`**: Defines the sender’s e-mail address. This is the from address on notification e-mails.
  - `<SENDER-EMAIL>` – Specify the sender’s e-mail address (should not exceed 64 characters in length). Use the `email-notification > recipient > <EMAIL-ADDRESS>` command to configure the recipient’s address.

- **port `<1-65535>`**: This option is recursive and applicable to the ‘security’ and ‘username’ parameters. Configures the SMTP server port. Use this option to configure a non-standard SMTP port on the outgoing SMTP server. The standard SMTP port is 25.
  - `<1-65535>` – Specify the port from 1 - 65535.
### security

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>No encryption used</td>
</tr>
<tr>
<td>ssl</td>
<td>Uses Secure Sockets Layer (SSL) encryption between the SMTP server and the client</td>
</tr>
<tr>
<td>starttls</td>
<td>Uses STARTTLS encryption between the SMTP server and the client</td>
</tr>
</tbody>
</table>

This option is recursive and applicable to the `port` and `username` parameters.

### Examples

```text
rfs7000-37FABE(config-profile-default-rfs7000)#email-notification recipient test@examplecompany.com
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
dscp-mapping 20 priority 7
no autoinstall configuration
no autoinstall firmware
............................................................
interface ge4
  ip dhcp trust
  qos trust dscp
  qos trust 802.1p
use firewall-policy default
email-notification recipient test@examplecompany.com
service pm sys-restart
rfs7000-37FABE(config-profile-default-rfs7000)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables or reverts settings to their default</td>
</tr>
</tbody>
</table>
7.1.24 enforce-version

Profile Config Commands

Enables checking of a device’s firmware version before attempting adoption or clustering.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`enforce-version [adoption|cluster] [full|major|minor|none|strict]`

Parameters

- `enforce-version [adoption|cluster] [full|major|minor|none|strict]`

| adoption | Verifies firmware versions before adopting. This option is enabled by default. |
| cluster | Verifies firmware versions before clustering. This option is enabled by default. |
| full | Allows adoption or clustering when the first four octets of the firmware versions match (for example 5.8.4.0) |
| major | Allows adoption or clustering when the first two octets of the firmware versions match (for example 5.8) |
| minor | Allows adoption or clustering when the first three octets of the firmware versions match (for example 5.8.4) |
| none | Allows adoption or clustering between any firmware versions |
| strict | Allows adoption or clustering only when firmware versions exactly match (for example 5.8.4.0-008D). This is the default setting for both ‘adoption’ and ‘cluster’ options. |

Examples

nx4500-5CFA2B(config-profile-testNX45XX)#enforce-version cluster full
nx4500-5CFA2B(config-profile-testNX45XX)#enforce-version adoption major

nx4500-5CFA2B(config-profile-testNX45XX)#show context profile nx45xx testNX45XX
  slot 1
  slot 2
  use firewall-policy default
  `enforce-version adoption major`
  `enforce-version cluster full`
  service pm sys-restart
  router ospf
  router bgp
  dot1x system-auth-control
  dot1x use aaa-policy test
  service fast-switching
  nx4500-5CFA2B(config-profile-testNX45XX)#

Related Commands

- `no` Disables or reverts settings to their default
### 7.1.25 environmental-sensor

#### Profile Config Commands

Configures the environmental sensor settings

An AP8132 sensor module is a USB environmental sensor extension to an AP8132 model access point. It provides a variety of sensing mechanisms, allowing the monitoring and reporting of the AP8132's radio coverage area.

Supported in the following platforms:
- Access Points — AP8132

#### Syntax

- `environmental-sensor [humidity|light|motion|polling-interval|temperature]`
- `environmental-sensor [humidity|motion|polling-interval <1-100>|temperature]`
- `environmental-sensor light {holdtime|radio-shutdown|threshold}
  [holdtime <10-201>|radio-shutdown [all|radio-1|radio-2]}
  [threshold [high <100-10000>|low <0-1000>]]`

#### Parameters

- **humidity**
  - Enables (turns on) humidity sensors. This setting is enabled by default.

- **motion**
  - Enables (turns on) motion sensors. This setting is enabled by default.

- **polling-interval <1-100>**
  - Configures polling interval, in seconds, on all sensors. This setting is enabled by default.
  - <1-100> – Specify a value from 1 - 100 seconds. The default is 5 seconds.

- **temperature**
  - Enables (turns on) temperature sensors. This setting is enabled by default.

- **light**
  - Enables (turns on) light sensors and specifies its settings
  - When enabled, the sensor module polls the environment to determine the light intensity.
  - Based on the reading, the system determines whether the AP8132's deployment location has lights on or off. Light intensity also helps determine whether the access point's deployment location is currently populated with clients.

  - **holdtime <10-201>**
    - Optional. Configures a holdtime, in seconds, for the light sensor
    - <10-201> – Specify a value from 10 - 201 seconds. The default value is 11 seconds.

  - **radio-shutdown [all|radio1|radio2]**
    - Optional. Shuts down the sensor's radios
    - all – Shuts down all radios. This is the default setting.
    - radio1 – Shuts down radio 1

Contd..
environmental-sensor light \{threshold [high <100-10000>|low <0-1000>]\}

**environmental-sensor**
Configures environmental sensor settings on this profile

**light**
Enables (turns on) light sensors and specifies its settings

**threshold**
Optional. Configures the upper and lower thresholds for the amount of light in the environment

**high <100-10000>**
Specifies the upper threshold from 100 - 10000 lux. This value determines whether lighting is on in the AP8132’s deployment location. The radios are turned off if the average reading value is lower than the value set here. The default is 400 lux.

**Note:** The light sensor triggers an event if the amount of light exceeds the specified value.

**low <0-1000>**
Specifies the lower threshold from 0 - 1000 lux. This value determines whether lighting is off in the AP8132’s deployment location. The radios are turned on when the average value is higher than the value set here. The default is 200 lux.

**Note:** The light sensor triggers an event if the amount of light drops below the specified value.

---

**Examples**

```
rfs4000-229D58(config-profile-testRFS4000)#environmental-sensor humidity
rfs4000-229D58(config-profile-testRFS4000)#environmental-sensor polling-interval 60
rfs4000-229D58(config-profile-testRFS4000)#environmental-sensor light radio-shutdown all
rfs4000-229D58(config-profile-testRFS4000)#environmental-sensor light threshold high 300
rfs4000-229D58(config-profile-testRFS4000)#environmental-sensor light threshold low 100
rfs4000-229D58(config-profile-testRFS4000)#show context
```

```
profile rfs4000 testRFS4000
  bridge vlan 1
tunnel-over-level2
ip igmp snooping
ip igmp snooping querier
environmental-sensor polling-interval 60
environmental-sensor light threshold high 300
environmental-sensor light threshold low 100
environmental-sensor light radio-shutdown all
no autoinstall configuration
no autoinstall firmware
device-upgrade persist-images
--More--
rfs4000-229D58(config-profile-testRFS4000)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes the environmental sensor’s settings</td>
</tr>
</tbody>
</table>
### events

#### Profile Config Commands

Displays system event messages

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
events [forward on|on]
```

#### Parameters

- `events` [forward on|on]

<table>
<thead>
<tr>
<th>command</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>forward on</td>
<td>Forwards system event messages to the wireless controller, service platform, or cluster members. This feature is enabled by default.</td>
</tr>
<tr>
<td>on</td>
<td>- on – Enables forwarding of system events</td>
</tr>
<tr>
<td></td>
<td>Generates system events. This feature is enabled by default.</td>
</tr>
</tbody>
</table>

#### Examples

```
rfs7000-37FABE(config-profile-default-rfs7000)#events forward on
rfs7000-37FABE(config-profile-default-rfs7000)#
```

#### Related Commands

<table>
<thead>
<tr>
<th>command</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables or reverts settings to their default</td>
</tr>
</tbody>
</table>
7.1.27 export

**Profile Config Commands**

Enables export of startup.log file after every boot

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
export startup-log [max-retries|retry-interval|url]
export startup-log [max-retries <2-65535>|retry-interval <30-86400>|url <URL>]
```

**Parameters**

- **export startup-log [max-retries <2-65535>|retry-interval <30-86400>|url <URL>]**

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>max-retries 2-65535</td>
<td>Configures the maximum number of retries in case the export process fails</td>
</tr>
<tr>
<td>retry-interval 30-86400</td>
<td>Configures the interval between two consecutive retries</td>
</tr>
<tr>
<td>url &lt;URL&gt;</td>
<td>Configures the destination URL in the following format:</td>
</tr>
<tr>
<td></td>
<td>tftp://&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>ftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
</tr>
<tr>
<td></td>
<td>sftp://&lt;user&gt;@&lt;hostname</td>
</tr>
</tbody>
</table>

**Examples**

```
nx4500-5CFA2B(config-profile-testNX45XX)#export startup-log max-retries 10 retry-interval 30 url test@examplecompany.com

nx4500-5CFA2B(config-profile-testNX45XX)#show context
profile nx45xx testNX45XX
slot 1
slot 2
.................................................................
interface wwan1
interface pppoe1
use firewall-policy default
export startup-log max-retries 10 retry-interval 30 url test@examplecompany.com
enforce-version adoption major
enforce-version cluster full
service pm sys-restart
router ospf
router bgp
dot1x system-auth-control
dot1x use aaa-policy test
service fast-switching
nx4500-5CFA2B(config-profile-testNX45XX)#
```

**Related Commands**

- **no** Enables export of startup.log file
### 7.1.28 file-sync

**Profile Config Commands**

Configures parameters enabling auto syncing of PKCS#12 certificate between the staging-controller and adoptee AP6522/AP6562 client bridges

This command is applicable to the access point's profile as well as device configuration modes.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
file-sync [auto|count <1-20>]
```

**Parameters**

- `file-sync [auto|count <1-20>]`

| file-sync [auto|count <1-20>] | Configures the following file-synching parameters: |
|-------------------------------|--------------------------------------------------|
|                               | • auto – Enables the staging controller to autoinstall PKCS#12 certificate on a new layer 2 AP6522/AP6562 client bridge, when it comes up for the first time and adopts to the controller. The PKCS#12 certificate is installed only if the client bridge is using EAP-TLS authentication. Prior to enabling file syncing, ensure that the PKCS#12 certificate is present on the staging controller. To upload the certificate on the controller, in the user or privilege executable modes, execute the following command: file-sync > load-file > <URL>. For more information, see file-sync. |
|                               | • count <1-20> – Configures the maximum number of access points that can be concurrently autoinstalled. |
|                               | • <1-20> – Specify a value from 1 - 20. The default is 10 access points. |

**Note:** For the NX9XXX service platforms the count-range is from 1 - 128.

**Examples**

```plaintext
nx9500-6C8809(config-profile-default-rfs6000)#file-sync auto

nx9500-6C8809(config-profile-default-rfs6000)#file-sync count 8

nx9500-6C8809(config-profile-default-rfs6000)#show context profile rfs6000 default-rfs6000
no autoinstall configuration
no autoinstall firmware
no device-upgrade auto
file-sync count 8
file-sync auto
crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ikev2 policy ikev2-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
--More--
```

**Related Commands**

| `no` | Disables automatic syncing of PKCS#12 certificate between the staging-controller and adoptee AP6522/AP6562 client bridges |
7.1.29 floor

Profile Config Commands

Sets the floor name where the target device (access point, wireless controller, or service platform using this profile) is physically located. Assigning a building floor name helps in grouping devices within the same general coverage area.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
floor <WORD> {<1-4094>}
```

Parameters

- `floor <WORD> {<1-4094>}`

<table>
<thead>
<tr>
<th>floor &lt;WORD&gt; {&lt;1-4094&gt;}</th>
<th>Sets the floor name where the target device is located</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;WORD&gt;</code> – Specify the floor name (should not exceed 64 characters in length).</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;1-4094&gt;</code> – Optional. Configures the floor number from 1 - 4094. The default is 1.</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-profile-default-rfs7000)#floor fifth
```

```
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
  ip igmp snooping
  ip igmp snooping querier
  area Ecospace
floor fifth
autoinstall configuration
autoinstall firmware
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#
```

Related Commands

```
no
```

Resets the configured floor name and number
7.1.30 gre

Profile Config Commands

The following table summarizes commands that allow you to enter the GRE configuration mode:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>gre</td>
<td>Enables GRE tunneling on a profile/device This command also creates a GRE tunnel and enters its configuration mode. Use this command to modify an existing GRE tunnel's settings.</td>
<td>page 7-151</td>
</tr>
<tr>
<td>gre-config-instance</td>
<td>Summarizes GRE tunnel configuration mode commands</td>
<td>page 7-153</td>
</tr>
</tbody>
</table>
7.1.30.1 gre

Enables Generic Routing Encapsulation (GRE) tunneling on this profile, and creates a new GRE tunnel or modifies an existing GRE tunnel.

The GRE protocol allows encapsulation of one protocol over another. It is a tunneling protocol that transports any layer 3 protocol over an IP network. When enabled, a payload packet is first encapsulated in the GRE protocol. The GRE encapsulated payload is then encapsulated in another IP packet before being forwarded to the destination.

GRE tunneling can be configured to bridge Ethernet packets between WLANs and a remote WLAN gateway over an IPv4 GRE tunnel. The tunneling of 802.3 packets using GRE is an alternative to MiNT or L2TPv3. Related features like ACLs for extended VLANs are still available using layer 2 tunneling over GRE.

Using GRE, access points map one or more VLANs to a tunnel. The remote end point is a user-configured WLAN gateway IP address, with an optional secondary IP address should connectivity to the primary GRE peer be lost. VLAN traffic is expected in both directions in the GRE tunnel. A WLAN mapped to these VLANs can be either open or secure. Secure WLANs require authentication to a remote RADIUS server available within your deployment using standard RADIUS protocols. Access Points can reach both the GRE peer as well as the RADIUS server using IPv4.

The WiNG software now supports for both IPv4 or IPv6 tunnel endpoints. However, a tunnel needs to contain either IPv4 or IPv6 formatted device addresses and cannot be mixed. With the new IPv6 tunnel implementation, all outbound packets are encapsulated with the GRE header, then the IPv6 header. The header source IP address is the local address of the IPv6 address of tunnel interface, and the destination address peer address of the tunnel. All inbound packets are de-capsulated by removing the IPv6 and GRE header before sending it over to the IP stack.

NOTE: Only one GRE tunnel can be created for every profile.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7512, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

gre tunnel <GRE-TUNNEL-NAME>

Parameters

- gre tunnel <GRE-TUNNEL-NAME>

<table>
<thead>
<tr>
<th>gre tunnel &lt;GRE-TUNNEL-NAME&gt;</th>
<th>Creates a new GRE tunnel or modifies an existing GRE tunnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;GRE-TUNNEL-NAME&gt;</td>
<td>Creates a new GRE tunnel or modifies an existing GRE tunnel</td>
</tr>
<tr>
<td>• &lt;GRE-TUNNEL-NAME&gt; – If creating a new tunnel, specify a unique name for it. If modifying an existing tunnel, specify its name.</td>
<td></td>
</tr>
</tbody>
</table>
Examples

rfs4000-229D58(config-profile testRFS4000-gre-tunnel-testGREtunnel)#?
GRE Tunnel Mode commands:
dscp                      Differentiated Services Code Point
establishment-criteria   Set tunnel establishment criteria
failover                  L2gre tunnel failover
mtu                       L2GRE tunnel endpoint maximum transmission unit (MTU)
native                    Native trunking characteristics
no                        Negate a command or set its defaults
peer                      L2GRE peer
tunneled-vlan             VLANs to tunnel
clrscr                    Clears the display screen
commit                    Commit all changes made in this session
do                        Run commands from Exec mode
end                       End current mode and change to EXEC mode
exit                      End current mode and down to previous mode
help                      Description of the interactive help system
revert                    Revert changes
service                   Service Commands
show                      Show running system information
write                     Write running configuration to memory or terminal

rfs4000-229D58(config-profile testRFS4000-gre-tunnel-testGREtunnel)#
rfs4000-229D58(config-profile testRFS4000-gre-tunnel-testGREtunnel)#peer 1 ip 192.168.13.8
rfs4000-229D58(config-profile testRFS4000-gre-tunnel-testGREtunnel)#peer 2 ip 192.168.13.10
rfs4000-229D58(config-profile testRFS4000-gre-tunnel-testGREtunnel)#show context
gre tunnel testGREtunnel
peer 1 ip 192.168.13.8
peer 2 ip 192.168.13.10
rfs4000-229D58(config-profile testRFS4000-gre-tunnel-testGREtunnel)#
rfs4000-229D58(config-profile-testRFS4000)#show context
profile rfs4000 testRFS4000
bridge vlan 1
tunnel-over-level2
ip igmp snooping
ip igmp snooping querier

Related Commands

<table>
<thead>
<tr>
<th></th>
<th>Disables GRE tunneling on this profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables GRE tunneling on this profile</td>
</tr>
</tbody>
</table>
### 7.1.30.2 gre-config-instance

*gre*

The following table summarizes GRE tunnel configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dscp</td>
<td>Sets the GRE tunnel’s <em>Differentiated Services Code Point (DSCP)/802.1q</em> priority value</td>
<td>page 7-154</td>
</tr>
<tr>
<td>establishment-criteria</td>
<td>Configures the GRE tunnel establishment criteria</td>
<td>page 7-154</td>
</tr>
<tr>
<td>failover</td>
<td>Enables periodic pinging of the primary gateway to assess its availability, in case it is unreachable</td>
<td>page 7-156</td>
</tr>
<tr>
<td>mtu</td>
<td>Configures the <em>maximum transmission unit</em> (MTU) for IPv4/IPv6 L2GRE tunnel endpoints</td>
<td>page 7-157</td>
</tr>
<tr>
<td>native</td>
<td>Configures native trunking settings for this GRE tunnel</td>
<td>page 7-158</td>
</tr>
<tr>
<td>no</td>
<td>Removes the GRE tunnel settings based on the parameters passed</td>
<td>page 7-159</td>
</tr>
<tr>
<td>peer</td>
<td>Configures the GRE tunnel’s end-point peers</td>
<td>page 7-160</td>
</tr>
<tr>
<td>tunneled-vlan</td>
<td>Defines the VLAN that connected clients use to route GRE-tunneled traffic within their respective WLANs</td>
<td>page 7-161</td>
</tr>
</tbody>
</table>
### 7.1.30.2.1 dscp

**gre-config-instance**

Sets the GRE tunnel's DSCP / 802.1q priority value from encapsulated packets to the outer packet IPv4 header. This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
dscp [<0-63>|reflect]
```

**Parameters**

- `dscp [<0-63>|reflect]`

**Examples**

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#dscp 20
```

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#show context gre tunnel testGRETunnel
dscp 20
```

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#
```

The following example configures a GRE tunnel on a profile:

```
nx4500-5CFA2B(config-profile testNX45XX-gre-tunnel-testGRETunnel)#dscp 20
```

```
nx4500-5CFA2B(config-profile testNX45XX-gre-tunnel-testGRETunnel)#show context gre tunnel testGRETunnel
dscp 20
```

```
nx4500-5CFA2B(config-profile testNX45XX-gre-tunnel-testGRETunnel)#
```

**Related Commands**

- `no`
  Removes the GRE tunnel settings based on the parameters passed
### 7.1.30.2.2 establishment-criteria

**gre-config-instance**

Configures the GRE tunnel establishment criteria

In a multi-controller RF domain, it is always the master node that establishes the tunnel. The tunnel is created only if the tunnel device is designated as one of the following: vrrp-master, cluster-master, or rf-domain-manager.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
establishment-criteria [always|cluster-master|rf-domain-manager|vrrp-master <1-255>]
```

**Parameters**

- `establishment-criteria [always|cluster-master|rf-domain-manager|vrrp-master <1-255>]`

| establishment-criteria [always|cluster-master|rf-domain-manager|vrrp-master <1-255>] | Configures the GRE tunnel establishment criteria. The options are:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>always</td>
<td>Always automatically establishes tunnel (default setting). The tunnel device need not be a cluster master, RF Domain manager, or VRRP master to establish the GRE tunnel. This is the default setting.</td>
</tr>
<tr>
<td>cluster-master</td>
<td>Establishes tunnel only if the tunnel device is designated as the cluster master</td>
</tr>
<tr>
<td>rf-domain-manager</td>
<td>Establishes tunnel only if the tunnel device is designated as the RF Domain manager</td>
</tr>
<tr>
<td>vrrp-master &lt;1-255&gt;</td>
<td>Establishes tunnel only if the tunnel device is designated as the Virtual Router Redundancy (VRRP) master</td>
</tr>
<tr>
<td>&lt;1-255&gt;</td>
<td>Configures the VRRP group ID from 1 - 255. A VRRP group enables the creation of a group of routers as a default gateway for redundancy. Clients can point to the IP address of the VRRP virtual router as their default gateway and utilize a different group member if a master becomes unavailable.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#establishment-criteria rf-domain-manager

nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#show context gre_tunnel testGREtunnel
 establishment-criteria rf-domain-manager

nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#
```
7.1.30.2.3 failover

- gre-config-instance

Enables periodic pinging of the primary gateway to assess its availability. When enabled, the system continues pinging, an unreachable gateway, for a specified number of times and at the specified interval.

This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
failover interval <1-250> retry <1-10>
```

Parameters

- **failover interval <1-250> retry <1-10>**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>failover interval &lt;1-250&gt;</td>
<td>Specifies the interval, in seconds, between two successive pings to the primary gateway. If the primary gateway is unreachable, the system pings it at intervals specified here.</td>
</tr>
<tr>
<td>retry &lt;1-10&gt;</td>
<td>&lt;1-250&gt; – Specify a value from 1 - 250 seconds.</td>
</tr>
<tr>
<td></td>
<td>retry – Specifies the maximum number attempts made to ping the primary gateway before the session is terminated.</td>
</tr>
<tr>
<td></td>
<td>&lt;1-10&gt; – Specify a value from 1 - 10.</td>
</tr>
</tbody>
</table>

Examples

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#failover interval 200 retry 5
```

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#show context gre tunnel testGRETunnel
dscp 20
  failover interval 200 retry 5
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the GRE tunnel settings based on the parameters passed</td>
</tr>
</tbody>
</table>
7.1.30.2.4 mtu

> gre-config-instance

Configures the MTU for IPv4/IPv6 L2GRE tunnel endpoints

The MTU is the largest physical packet size (in bytes) transmittable within the tunnel. Any messages larger than the configured MTU are divided into smaller packets before transmission. Larger the MTU greater is the efficiency because each packet carries more user data, while protocol overheads, such as headers or underlying per-packet delays remain fixed; the resulting higher efficiency means a slight improvement in bulk protocol throughput. A larger MTU results in the processing of fewer packets for the same amount of data.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

mtu [ipv4 <900-1476>|ipv6 <1236-1456>]

Parameters

- mtu [ipv4 <900-1476>|ipv6 <1236-1456>]

| mtu [ipv4 <900-1476>|ipv6 <1236-1456>] | Configures the MTU for L2GRE tunnel endpoints |
|-----------------------------------------|-------------------------------|
| • ipv4 <900-1476>                      | — Configures IPv4 L2GRE tunnel endpoint MTU from 900 - 1476. The default is 1476. |
| • ipv6 <1236-1456>                     | — Configures IPv6 L2GRE tunnel endpoint MTU from 1236 - 1456. The default is 1456. |

Examples

nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#mtu ipv4 1200

nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#mtu ipv6 1300

nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#show contextgre tunnel testGREtunnel
  mtu ipv4 1200
  mtu ipv6 1300
  establishment-criteria rf-domain-manager

nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#
7.1.30.2.5 native

Configures native trunking settings for this GRE tunnel

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

native [tagged|vlan <1-4094>]

Parameters

- native [tagged|vlan <1-4094>]

| native tagged | Enables native VLAN tagging
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The IEEE 802.1Q specification is supported for tagging frames and coordinating</td>
</tr>
<tr>
<td></td>
<td>VLANs between devices. IEEE 802.1Q adds four bytes to each frame identifying</td>
</tr>
<tr>
<td></td>
<td>the VLAN ID for upstream devices that the frame belongs. If the upstream Ethernet</td>
</tr>
<tr>
<td></td>
<td>device does not support IEEE 802.1Q tagging, it does not interpret the tagged</td>
</tr>
<tr>
<td></td>
<td>frames. When VLAN tagging is required between devices, both devices must support</td>
</tr>
<tr>
<td></td>
<td>tagging and be configured to accept tagged VLANs. When a frame is tagged, the</td>
</tr>
<tr>
<td></td>
<td>12 bit frame VLAN ID is added to the 802.1Q header so upstream Ethernet devices</td>
</tr>
<tr>
<td></td>
<td>know which VLAN ID the frame belongs to. The device reads the 12 bit VLAN ID and</td>
</tr>
<tr>
<td></td>
<td>forwards the frame to the appropriate VLAN. When a frame is received with no</td>
</tr>
<tr>
<td></td>
<td>802.1Q header, the upstream device classifies the frame using the default or</td>
</tr>
<tr>
<td></td>
<td>native VLAN assigned to the Trunk port. The native VLAN allows an Ethernet</td>
</tr>
<tr>
<td></td>
<td>device to associate untagged frames to a VLAN when no 802.1Q frame is included</td>
</tr>
<tr>
<td></td>
<td>in the frame. This feature is disabled by default.</td>
</tr>
</tbody>
</table>

- native vlan <1-4094> | Specifies a numerical VLAN ID (1 - 4094) for the native VLAN
|                        | The native VLAN allows an Ethernet device to associate untagged frames to a VLAN, |
|                        | when no 802.1q frame is included in the frame. Additionally, the native VLAN is  |
|                        | the VLAN untagged traffic is directed over when using a port in trunk mode.

Examples

nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#native tagged
nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#native vlan 20

nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#show context
gre tunnel testGREtunnel
native vlan 20
native tagged
mtu ipv4 1200
mtu ipv6 1300
establishment-criteria rf-domain-manager
nx9500-6C8809(config-profile testNX9000-gre-tunnel-testGREtunnel)#

Related Commands

no | Removes the GRE tunnel settings based on the parameters passed
7.1.30.2.6 no

`gre-config-instance`

Removes or resets the GRE tunnel settings based on the parameters passed

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [dscp|establishment-criteria|failover|mtu|native|peer|tunneled-vlan]

no [dscp|establishment-criteria|failover|tunneled-vlan]

no mtu [ipv4|ipv6]

no native [tagged|vlan]

no peer <1-2>

Parameters
- no <PARAMETERS>

no <PARAMETERS> Removes or resets the GRE tunnel’s settings based on the parameters passed

Examples

The following example shows the GRE tunnel ‘testGRETunnel’ settings before the no commands are executed:

```bash
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#show context
gre tunnel testGRETunnel
  peer 1 ip 192.168.13.6
  native vlan 1
tunneled-vlan 1,10
  native tagged
dscp 20
  failover interval 200 retry 5
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#
```

```bash
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#no dscp
```

```bash
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#no native vlan
```

```bash
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#no tunneled-vlan
```

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#no failover
```

The following example shows the GRE tunnel ‘testGRETunnel’ settings after the no commands are executed:

```bash
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#show context
gre tunnel testGRETunnel
  peer 1 ip 192.168.13.6
  native tagged
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#
```
7.1.30.2.7 peer

*gre-config-instance*

Adds the GRE tunnel's end-point peers. A maximum of two peers, representing the tunnel's end points, can be added for each GRE tunnel.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
peer <1-2> ip <IPv4/IPv6>
```

**Parameters**

- `peer <1-2> ip <IPv4/IPv6>`

<table>
<thead>
<tr>
<th>peer &lt;1-2&gt; ip &lt;IPv4/IPv6&gt;</th>
<th>Configures the tunnel's end-point peers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;1-2&gt; – Specify a numeric index for each peer to help differentiate the tunnel end points.</td>
</tr>
<tr>
<td></td>
<td>• ip – Specify the IP address (IPv4/IPv6) of the added GRE peer to serve as a network address identifier.</td>
</tr>
<tr>
<td></td>
<td>• &lt;IPv4/IPv6&gt; – Specify the peer’s IPv4 or IPv6 address.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#peer 1 ip 192.168.13.6
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#show context
gre tunnel testGRETunnel
peer 1 ip 192.168.13.6
native tagged
dscp 20
failover interval 200 retry 5
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#
```

**Related Commands**

- `no` | Removes the GRE tunnel settings based on the parameters passed
7.1.30.2.8 tunneled-vlan

`gre-config-instance`

Defines the VLAN that connected clients use to route GRE tunneled traffic within their respective WLANs.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
```
tunneled-vlan <VLAN-ID>
```

Parameters
```
- tunneled-vlan <VLAN-ID>
```

| tunneled-vlan <VLAN-ID> | Specifies the VLANS associated with this GRE tunnel
|-------------------------|------------------------------------------------------
| <VLAN-ID>               | <VLAN-ID> – Specify the VLAN IDs. Specify a comma-separated list of IDs, to specify multiple VLANS. For example, 1,10,12,16-20.

Examples
```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#tunneled-vlan 10

rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#show context
gre tunnel testGRETunnel
peer 1 ip 192.168.13.6
native vlan 1
tunneled-vlan 1,10
native tagged
dscp 20
failover interval 200 retry 5
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#
```

Related Commands
```
no
```

Removes the GRE tunnel settings based on the parameters passed.
7.1.31 guest-manager-server

Profile Config Commands

Configures the guest manager server host

Supported in the following platforms:
• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

guest-manager-server <1-3> host [<IP>|<HOSTNAME>|<IPv6>] {http|https}

Parameters

• guest-manager-server <1-3> host [<IP>|<HOSTNAME>|<IPv6>] {http|https}

<table>
<thead>
<tr>
<th>guest-manager-server &lt;1-3&gt;</th>
<th>Configures the guest manager server host’s IPv4/IPv6 or hostname</th>
</tr>
</thead>
<tbody>
<tr>
<td>host [&lt;IP&gt;</td>
<td>&lt;HOSTNAME&gt;</td>
</tr>
<tr>
<td>{http</td>
<td>https}</td>
</tr>
<tr>
<td></td>
<td>server. The options are:</td>
</tr>
<tr>
<td></td>
<td>• HTTP – Optional. Uses HTTP to connect to the server</td>
</tr>
<tr>
<td></td>
<td>• HTTPS – Optional. Uses HTTPS to connect to the server. HTTPS is recommended,</td>
</tr>
<tr>
<td></td>
<td>as it affords some additional data protection HTTP cannot provide. The default</td>
</tr>
<tr>
<td></td>
<td>value however is HTTP.</td>
</tr>
</tbody>
</table>

Examples

nx4500-5CFA8E(config-profile-testNX65XX)#guest-manager-server 1 host 192.168.13.13 https

nx4500-5CFA8E(config-profile-testNX65XX)#show context
profile nx65xx testNX65XX
  slot 1
  slot 2
  slot 3
  slot 4
  no autoinstall configuration


Related Commands

| no | Removes the guest management server host configuration |
**7.1.32 http-analyze**

### Profile Config Commands

Enables HTTP analysis on this profile. Use this command to configure the mode and interval at which data is sent to the controller (running the HTTP analytics engine).

In a hierarchically organized network, HTTP analytics data forwarding is a simple and transparent process. The site controllers (RFS4000, RFS6000, RFS7000, NX45XX, and NX65XX) receive the HTTP data from adopted APs. This data is compressed and forwarded to the Network Operations Center (NOC) controller. The NOC controller caches, formats, and uploads this information to the external analytics engine. There is no need for a separate configuration to enable this feature.

For more information on the hierarchical network, see `device-upgrade`.

For more information on HTTP analytics feature on the NX95XX service platform, see `http-analyze (NX45XX, NX65XX, and NX9000)`.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```
http-analyze [compress|update-interval <1-3600>]
```

**Parameters**

- `http-analyze [compress|update-interval <1-3600>]`

<table>
<thead>
<tr>
<th><code>http-analyze</code></th>
<th>Configures HTTP analysis parameters. These parameters are: compress and update-interval.</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>compress</code></td>
<td>Compresses update files before forwarding to the controller. This option is disabled by default.</td>
</tr>
<tr>
<td><code>update-interval &lt;1-3600&gt;</code></td>
<td>Sets the interval, in seconds, at which buffered packets are pushed to analyze the HTTP data</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;1-3600&gt;</code> – Specify the interval from 1 - 3600 seconds. The default is 60 seconds.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000)#http-analyze compress
rfs7000-37FABE(config-profile-default-rfs7000)#http-analyze update-interval 200
```

```
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
  ip igmp snooping
  ip igmp snooping querier
  autoinstall configuration
  autoinstall firmware
  crypto isakmp proposal default encryption aes-256 group 2 hash sha
  crypto isakmp proposal default encryption aes-256 group 2 hash sha
  ..........................................................
  qos trust 802.1p
  interface pppoe1
  use firewall-policy default
  http-analyze update-interval 200
  http-analyze compress
  service pm sys-restart
  router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#
```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables HTTP analyze settings</td>
</tr>
</tbody>
</table>
7.1.33 http-analyze (NX45XX, NX65XX, and NX9000)

Profile Config Commands

Enables forwarding of HTTP request related data to the HTTP analytics engine.

Wireless clients (MUs) connect to APs and route their HTTP requests through the APs. These APs extract and forward HTTP request packets, through MiNT, to the NX series controller. The NX series controller uses a new analytic daemon to cache, format, and forward information to the analytics engine. Currently the analytics daemon is supported only on the NX series service platform. Therefore, it is essential that all APs should use an NX series service platform as controller.

In a hierarchically organized network, HTTP analytics data forwarding is a simple and transparent process. The site controllers (RFS4000, RFS6000, RFS7000, NX45XX, and NX65XX) receive the HTTP data from adopted APs. This data is compressed and forwarded to the Network Operations Center (NOC) controller. There is no need for a separate configuration to enable this feature.

Use this command to configure the mode and interval at which data is sent to the controller and the external analytics engine. This command also configures the external engine’s details, such as URL, credentials, etc.

A NX9500 and NX9510 model service platforms (NOC) can provide granular and robust analytic reporting for a RFS4000, RFS6000 or RFS7000 controller managed network or a NX45XX/NX65XX service platform managed network. You can use the analytics feature Using analytics, data is collected at administrator defined intervals.

Analytics can parse and process Smart RF events within the NOC managed network as events are received. When a Smart RF event occurs, the analytics engine parses the new channel and power information from the Smart RF event, as opposed to retrieving the event from the devices themselves.

The analytics user interface populates information within a data store, with multiple displays partitioned by performance function. The data store is a customizable display managed with just the content the administrator wants viewed. The data store is purged after 90 days if no administration is conducted sooner.

A separate hot spare analytics license is enforced at the NOC. The license restricts the number of Access Point streams processed at the NOC or forwarded to partner systems for further processing. The analytics feature can be turned on at select APs by enabling them in configuration. This way the customer can enable analytics on a select set of APs and not the entire system as long as the number of APs on which it is enabled is less than or equal to the total number of AP analytics licenses available at the NOC controller.

NOTE: The Analytics module helps gather data about customer behavior such as web sites visited, search terms used, mobile device types, number of new users vs. repeat users. This data provides a better understanding of pricing strategies and promotions being run by competitors.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

http-analyze [compress|controller|external-server|update-interval]

http-analyze [compress|controller|update-interval <1-3600>]

http-analyze external-server [password|proxy|update-interval|url|user-name|validate-server-certificate]

http-analyze external-server [password <WORD>|proxy <URL>|update-interval <1-3600>|url <URL>|username <WORD>|validate-server-certificate]
Parameters

- `http-analyze [compress|controller|update-interval <1-3600>]`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>http-analyze</code></td>
<td>Configures HTTP analysis related parameters</td>
</tr>
<tr>
<td><code>compress</code></td>
<td>Compresses update files before forwarding to the controller. This option is disabled by default.</td>
</tr>
<tr>
<td><code>controller</code></td>
<td>Sends the collected analytics data to the controller (data is forwarded to a local analytics engines on the NX series service platform)</td>
</tr>
<tr>
<td><code>update-interval &lt;1-3600&gt;</code></td>
<td>Configures the interval, in seconds, at which buffered packets are pushed to the controller</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;1-3600&gt;</code> – Specify the interval from 1 - 3600 seconds. The default is 60 seconds.</td>
</tr>
</tbody>
</table>

- `http-analyze external-server [password <WORD>|proxy <URL>|update-interval|url|username|validate-server-certificate]`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>http-analyze external-server</code></td>
<td>Configures the external HTTP analytics engine’s parameters</td>
</tr>
<tr>
<td><code>password &lt;WORD&gt;</code></td>
<td>Configures the external analytics engine’s password</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;WORD&gt;</code> – Provide the login password. This is the password associated with the user name needed to access the external analytics engine.</td>
</tr>
<tr>
<td><code>proxy &lt;URL&gt;</code></td>
<td>Configures the proxy server’s <code>uniform resource locator</code> (URL)</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;URL&gt;</code> – Specify the proxy server’s URL in the following format:</td>
</tr>
<tr>
<td></td>
<td><a href="http://username:password@proxy-server:port">http://username:password@proxy-server:port</a>.</td>
</tr>
<tr>
<td></td>
<td>For example, <a href="http://mot:ym@wwgate0.mot.com:1080">http://mot:ym@wwgate0.mot.com:1080</a></td>
</tr>
<tr>
<td><code>update-interval &lt;1-3600&gt;</code></td>
<td>Configures the interval, in seconds, at which buffered packets are pushed to the external analytics engine</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;1-3600&gt;</code> – Specify the interval from 1 - 3600 seconds. The default is 60 seconds.</td>
</tr>
<tr>
<td><code>url &lt;URL&gt;</code></td>
<td>Configures the external analytics engine’s IP address or URL</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;URL&gt;</code> – Provide the IP address or URL.</td>
</tr>
<tr>
<td><code>username &lt;WORD&gt;</code></td>
<td>Configures the user name needed to access the external analytics engine</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;WORD&gt;</code> – Provide the user name.</td>
</tr>
<tr>
<td><code>validate-server-certificate</code></td>
<td>Validates the external analytics engine’s certificate, if it is using HTTPS as the mode of access</td>
</tr>
</tbody>
</table>

Examples

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B)#http-analyze external-server username anonymous
nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B)#http-analyze external-server password anonymous
nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B)#http-analyze external-server validate-server-certificate
nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B)#http-analyze external-server update-interval 100

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B)#show context
nx4500xx B4-C7-99-5C-FA-2B
use profile default-nx4500
use rf-domain default
hostname nx4500-5CFA2B
license AP DEFAULT-12AP-LICENSE
license ADSEC DEFAULT-ADV-SEC-LICENSE
ip default-gateway 192.168.13.2
interface up1
no shutdown
switchport mode access
switchport access vlan 1
interface vlan1
ip address 192.168.13.12/24
logging on
logging console warnings
logging buffered warnings
http-analyze external-server url https://192.168.13.10
http-analyze external-server username anonymous
http-analyze external-server password anonymous
http-analyze external-server validate-server-certificate
http-analyze external-server update-interval 100

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B)#

Related Commands

| no | Disables HTTP analytics settings on an NX series service platform |
### 7.1.34 interface

#### Profile Config Commands

The following table summarizes interface configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface</td>
<td>Selects an interface to configure</td>
<td>page 7-169</td>
</tr>
<tr>
<td>interface-config-instance</td>
<td>Summarizes Ethernet interface (associated with the wireless controller or service platform) configuration commands</td>
<td>page 7-173</td>
</tr>
<tr>
<td>interface-config-vlan-instance</td>
<td>Summarizes VLAN interface configuration commands</td>
<td>page 7-200</td>
</tr>
<tr>
<td>interface-config-radio-instance</td>
<td>Summarizes radio interface configuration commands (applicable to devices with built-in radios)</td>
<td>page 7-218</td>
</tr>
<tr>
<td>interface-config-wwan-instance</td>
<td>Summarizes WWAN interface configuration commands</td>
<td>page 7-295</td>
</tr>
<tr>
<td>interface-config-serial-instance</td>
<td>Summarizes serial interface configuration commands (supported only on the NX45XX and NX65XX series service platform profiles)</td>
<td>page 7-306</td>
</tr>
<tr>
<td>interface-config-t1e1-instance</td>
<td>Summarizes the T1E1 interface configuration commands (supported only on the NX45XX and NX65XX series service platform profiles)</td>
<td>page 7-321</td>
</tr>
<tr>
<td>interface-config-vm-instance</td>
<td>Summarizes the virtual machine interface configuration commands (supported only on the NX45XX and NX65XX series service platform profiles)</td>
<td>page 7-334</td>
</tr>
<tr>
<td>interface-config-bluetooth-instance</td>
<td>Summarizes the Bluetooth radio interface configuration commands (supported only on the AP8432 and AP8533 model access points)</td>
<td>page 7-344</td>
</tr>
</tbody>
</table>
7.1.34.1 interface

Selects an interface to configure

A profile’s interface configuration can be defined to support separate physical Ethernet configurations both unique and specific to RFS4000, RFS6000, RFS7000 controllers and NX4500, NX6500, NX7500 and NX9000 series service platforms. Ports vary depending on the platform, but controller or service platform models do have some of the same physical interfaces.

A controller or service platform requires its virtual interface be configured for layer 3 (IP) access or layer 3 service on a VLAN. A virtual interface defines which IP address is associated with each VLAN ID the controller or service platform is connected to.

If the profile is configured to support an access point radio, an additional radio interface is available, unique to the access point’s radio configuration.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax Service Platforms

```
interface [<INTERFACE-NAME>|fe <1-4>|ge <1-24>|me1|port-channel <1-4>|pppoe1|
    radio [1|2|3]|serial <1-4>|t1e1 <1-4>|up <1-2>|vlan <1-4094>|vmif <1-12]|wwan1|
exge <1-4>]
```

Syntax Access Points and Wireless Controllers

```
interface [<INTERFACE-NAME>|bluetooth <1-1>|fe <1-4>|ge <1-8>|me1|
    port-channel <1-4>|pppoe1|radio [1|2|3]|up1|vlan <1-4094>|vmif <1-8]|wwan1|xge <1-4>]
```

Parameters

- **interface [<INTERFACE-NAME>|bluetooth <1-1>|fe <1-4>|ge <1-8>|me1|port-channel <1-4>|radio [1|2|3]|serial <1-4|t1e1 <1-4>|up <1-2>|vlan <1-4094>|vmif <1-8]|wwan1|xge <1-4>]

<table>
<thead>
<tr>
<th>&lt;INTERFACE-NAME&gt;</th>
<th>Enters the configuration mode of the interface identified by the &lt;INTERFACE-NAME&gt; keyword</th>
</tr>
</thead>
</table>
| bluetooth <1-1>   | Selects the Bluetooth radio interface
|                   |   • <1-1> – Specify the Bluetooth radio interface index from 1 - 1. As of now only one Bluetooth radio interface is supported.
|                   |   **Note:** This interface is applicable only for the AP8432 and AP8533 model access points. |
| fe <1-4>          | Selects a FastEthernet interface
|                   |   • <1-4> – Specify the interface index from 1 - 4.
|                   |   **Note:** This interface is applicable only for AP6511 model controller. |
| ge <1-24>         | Selects a GigabitEthernet interface
|                   |   • <1-24> – Specify the interface index from 1 - 24. (4 for RFS7000 and 8 for RFS6000).
|                   |   **Note:** The NX45XX and NX65XX series service platforms have 24 GigabitEthernet interface ports. |
| me1               | Selects a management interface
|                   |   Not applicable for RFS4000 model devices.
|                   |   The management interface is applicable only for RFS6000 and RFS7000 model controllers. |
port-channel <1-4>  | Selects the port channel interface  
|                  | • <1-4> – Specify the interface index from 1 - 4.  

pppoe1  | Selects the PPP over Ethernet interface to configure  

radio [1|2|3]  | Selects a radio interface  
|              | • 1 – Selects radio interface 1  
|              | • 2 – Selects radio interface 2  
|              | • 3 – Selects radio interface 3  
|              | The radio interface is not available on wireless controllers (exception RFS4011) or service platforms.  

serial <1-4>  | Selects a serial interface  
|              | • <1-4> – Specify the interface index from 1 - 4.  
|              | The serial interfaces are virtual interfaces available only on the NX45XX and NX65XX series service platforms.  

t1e1 <1-4>  | Selects the T1 and E1 slot interfaces  
|            | • <1-4> – Specify the T1 or E1 slot ID from 1 - 4.  
|            | The T1E1 interfaces are available only on the NX45XX and NX65XX series service platforms.  

up1  | Selects the uplink GigabitEthernet interface  
|     | The NX45XX and NX65XX series profiles support 2 uplink interfaces (up <1-2>).  

vlan <1-4094>  | Selects a VLAN interface  
|             | • <1-4094> – Specify the SVI VLAN ID from 1 - 4094.  

vmif <1-8>  | Selects the virtual machine (VM) interface  
|           | • <1-8> – Specify the VM interface index from 1 - 8.  
|           | The VM interfaces are available only on the NX45XX, NX65XX, NX9XXX series service platforms.  

wwan1  | Selects a Wireless WAN interface  
|       | This interface is applicable only to AP71XX, AP81XX, AP82XX, RFS4000, RFS6000 model access points and controllers.  

xge <1-4>  | Selects a TenGigabitEthernet interface  
|          | • <1-2> – Specify the interface index from 1 - 4.  

### Usage Guidelines

The ports available on a device vary depending on the model. The following ports are available on RFS4000, RFS6000 and RFS7000 model wireless controllers:

- RFS4000 - ge1, ge2, ge3, ge4, ge5, up1
- RFS6000 - ge1, ge2, ge3, ge4, ge5, ge6, ge7, ge8, me1, up1
- RFS7000 - ge1, ge2, ge3, ge4, me1

GE ports on are RJ-45 supporting 10/100/1000Mbps. GE ports on the RFS7000 can be RJ-45 or fiber ports supporting 10/100/1000Mbps.

ME ports are available on RFS6000 and RFS7000 platforms. ME ports are out-of-band management ports used to manage the controller via CLI or Web UI, even when the other ports on the controller are unreachable.

The ports available on service platforms also vary depending on the model. The following ports are available on NX series service platforms:

- NX4500 - up1, up2
- NX4524 - ge1-ge24, up1, up2
- NX5500 - ge1, ge2
- NX6500 - up1, up2
- NX6524 - ge1-ge24, up1, up2
- NX7500 - ge1-ge10, xge1-xge2
- NX9000 series - ge1, ge2, xge1-xge4
- EX3500 – ge1-1 to ge1-24
- EX3548 – ge1-1 to ge1-48

GE ports are available on RFS4000, RFS6000 and RFS7000 controllers and NX4524 and NX6524 model service platforms. GE ports are RJ-45 supporting 10/100/1000Mbps. GE ports on the RFS7000 can be RJ-45 or fiber ports supporting 10/100/1000Mbps.

ME ports are available on RFS6000 and RFS7000 platforms. ME ports are out-of-band management ports used to manage the controller via CLI or Web UI, even when the other ports on the controller are unreachable.

UP ports are available on RFS4000 and RFS6000 platforms. A UP port is used to connect to the backbone network. UP ports are available on RFS4000 and RFS6000 controllers and NX4500 and NX6500 series service platforms. A UP port supports either RJ-45 or fiber. The UP port is the preferred means to connect to the backbone as it has a non-blocking 1gbps connection unlike the GE ports.

The following ports are available on access points:
- AP6511 - fe1, fe2, fe3, fe4, up1
- AP6521 - GE1/POE (LAN)
- AP6522 - GE1/POE (LAN)
- AP6532 - GE1/POE
- AP6562 - GE1/POE
- AP7131 - GE1/POE (LAN), GE2 (WAN)
- AP7161 - GE1/POE (LAN), GE2 (WAN)
- AP7181 - GE1/POE (LAN), GE2 (WAN)
- AP7502 - GE1 (THRU), fe1, fe2, fe3,
- AP7522 - GE1/POE (LAN)
- AP7532 - GE1/POE (LAN)
- AP81XX - GE1/POE (LAN), GE2 (WAN)
- AP82XX - GE1/POE (LAN), GE2 (WAN)

**NOTE:** For a NX7500 model service platform, there are options for either a 2 port or 4 port network management card. Either card can be managed using WING. If the 4 port card is used, ports ge7-ge10 are available. If the 2 port card is used, ports xge1-xge2 are available.
Examples

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan44)#
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan44)#?
SVI configuration commands:
  crypto Encryption module
description Vlan description
dhcp Dynamic Host Configuration Protocol (DHCP)
dhcp-relayincoming Allow on-board DHCP server to respond to relayed DHCP packets on this interface
ip Interface Internet Protocol config commands
ipv6 Internet Protocol version 6 (IPv6)
no Negate a command or set its defaults
shutdown Shutdown the selected interface
use Set setting to use
clearscre Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
disable End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan44)#

nx4500-5CFA2B(config-profile-testNX45XX)#interface vmif 2
nx4500-5CFA2B(config-profile-testNX45XX-if-vmif12)#

nx4500-5CFA2B(config-profile-testNX45XX-if-vmif2)#?
VM Interface Mode commands:
description Port description
ip Internet Protocol (IP)
ipv6 Internet Protocol version 6 (IPv6)
no Negate a command or set its defaults
qos Quality of service
switchport Set switching mode characteristics
use Set setting to use
clearscre Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
disable End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

nx4500-5CFA2B(config-profile-testNX45XX-if-vmif2)#

Related Commands

| no | Removes the selected interface |
7.1.34.2 interface-config-instance

Use the config-profile-<PROFILE-NAME> instance to configure the Ethernet, VLAN and tunnel associated with the access point, wireless controller, or service platform.

To switch to this mode, use the following command:

```
<DEVICE>(config-profile-<DEVICE-PROFILE-NAME>)#interface [<INTERFACE-NAME>|fe <1-4>| ge <1-24>|me1|port-channel <1-4>|pppoe1|radio [1|2|3]|up1|vlan <1-4094>|wwan1|xge <1-4>]
```

The following example uses the config-profile-default-rfs7000 instance to configure a GigabitEthernet interface:

```
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#
Interface configuration commands:
captive-portal-enforcement Enable captive-portal enforcement on this port
cdp Cisco Discovery Protocol
class-group Channel group commands
description Interface specific description
dot1x 802.1X
duplex Set duplex to interface
dv Internet Protocol (IP)
dotv Internet Protocol version 6 (IPv6)
dldp Link Local Discovery Protocol
dmac-auth Enable mac-auth for this port
no Negate a command or set its defaults
power PoE Command
qos Quality of service
shutdown Shutdown the selected interface
spanning-tree Spanning tree commands
speed Configure speed
switchport Set switching mode characteristics
use Set setting to use
clear C1rsc1r clears the display screen
ccommit Commit all changes made in this session
do Run commands from Exec mode
dend End current mode and change to EXEC mode
dexit End current mode and down to previous mode
dhelp Description of the interactive help system
drevert Revert changes
dservice Service Commands
dshow Show running system information
dwrite Write running configuration to memory or terminal
```

```
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#
```

- **NOTE:** The NX45XX and NX65XX series service platforms have 24 GigabitEthernet ports.

The following table summarizes the interface configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal-enforcement</td>
<td>Enables captive-portal enforcement on this Ethernet port</td>
<td>page 7-175</td>
</tr>
<tr>
<td>cdp</td>
<td>Enables Cisco Discovery Protocol (CDP) on this Ethernet port</td>
<td>page 7-176</td>
</tr>
<tr>
<td>channel-group</td>
<td>Assigns this Ethernet port to a channel group</td>
<td>page 7-177</td>
</tr>
</tbody>
</table>
### Table 7.14 GE Interface Config Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Configures a description for this Ethernet port</td>
<td>page 7-178</td>
</tr>
<tr>
<td>dot1x (authenticator)</td>
<td>Configures 802.1X authenticator settings</td>
<td>page 7-179</td>
</tr>
<tr>
<td>dot1x (supplicant)</td>
<td>Configures 802.1X supplicant settings</td>
<td>page 7-181</td>
</tr>
<tr>
<td>duplex</td>
<td>Specifies the duplex mode for the interface</td>
<td>page 7-182</td>
</tr>
<tr>
<td>ip</td>
<td>Sets the IP address for this Ethernet port</td>
<td>page 7-183</td>
</tr>
<tr>
<td>ipv6</td>
<td>Sets the DHCPv6 and ICMPv6 neighbor discovery (ND) components for this interface</td>
<td>page 7-184</td>
</tr>
<tr>
<td>lldp</td>
<td>Configures Link Local Discovery Protocol (LLDP)</td>
<td>page 7-186</td>
</tr>
<tr>
<td>mac-auth</td>
<td>Enables MAC-based authentication on this Ethernet port</td>
<td>page 7-187</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts the selected Ethernet port settings</td>
<td>page 7-188</td>
</tr>
<tr>
<td>power</td>
<td>Configures Power over Ethernet (PoE) settings on this interface</td>
<td>page 7-189</td>
</tr>
<tr>
<td>qos</td>
<td>Enables QoS</td>
<td>page 7-190</td>
</tr>
<tr>
<td>shutdown</td>
<td>Disables the selected Ethernet port</td>
<td>page 7-191</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Configures spanning tree parameters</td>
<td>page 7-192</td>
</tr>
<tr>
<td>speed</td>
<td>Specifies the speed on this Ethernet port</td>
<td>page 7-195</td>
</tr>
<tr>
<td>switchport</td>
<td>Sets interface switching mode characteristics</td>
<td>page 7-196</td>
</tr>
<tr>
<td>use</td>
<td>Associates IPv4, IPv6, and/or MAC ACL with the selected Ethernet port</td>
<td>page 7-198</td>
</tr>
</tbody>
</table>
7.1.34.2.1 captive-portal-enforcement

`interface-config-instance`

Enables application of captive portal access permission rules to data transmitted over this specific Ethernet port. This setting is disabled by default.

Captive portal enforcement allows users on the wired network to pass traffic through the captive portal without being redirected to an authentication page. Authentication instead takes place when the RADIUS server is queried against the wired user's MAC address. If the MAC address is in the RADIUS server's user database, the user can pass traffic on the captive portal.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

captive-portal-enforcement {fall-back}

Parameters
- captive-portal-enforcement {fall-back}

<table>
<thead>
<tr>
<th>captive-portal-enforcement</th>
<th>Enables captive-portal enforcement on this Ethernet port</th>
</tr>
</thead>
<tbody>
<tr>
<td>fall-back</td>
<td>• fall-back – Optional. Enforces captive portal validation only if port authentication fails. When selected, captive portal policies are enforced only when RADIUS authentication of the client MAC address is not successful. If this option is not selected, captive portal policies are enforced regardless of the client's MAC address being in the RADIUS server's user database or not.</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-6DCD4B(config-device-B4-C7-99-6D-CD-4B-if-ge2)#captive-portal-enforcement
rfs7000-6DCD4B(config-device-B4-C7-99-6D-CD-4B-if-ge2)#show context interface ge2 captive-portal-enforcement
rfs7000-6DCD4B(config-device-B4-C7-99-6D-CD-4B-if-ge2)#
```

Related Commands

| no | Disables captive-portal enforcement on this interface |
7.1.34.2.2 cdp

*interface-config-instance*

Enables CDP on the selected GE port

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

cdp [receive|transmit]

**Parameters**

- cdp [receive|transmit]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>receive</td>
<td>Enables CDP packet snooping on this interface. When enabled, the port receives periodic interface updates from a multicast address. This option is enabled by default.</td>
</tr>
<tr>
<td>transmit</td>
<td>Enables CDP packet transmission on this interface. When enabled, the port sends out periodic interface updates to a multicast address to advertise its presence to neighbors. This option is enabled by default.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#cdp transmit

**Related Commands**

- **no** Disables CDP packet snooping on the controller or service platform’s selected GE ports
7.1.34.2.3 channel-group

Assigns this Ethernet port to a channel group. Ethernet ports can be aggregated to form a channel group. For example, an RFS7000 has four (4) Ethernet ports (1, 2, 3, & 4). These can be aggregated to form a minimum of one and maximum of two channel groups. A port can be a member of only one channel group at a time.

The maximum number of channel groups supported on a device depends on the number of Ethernet ports available.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
channel-group <1-4>

Parameters
- channel-group <1-4>

Examples
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#channel-group 1
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#show context interface ge1
  ip dhcp trust
gos trust dscp
gos trust 802.1p
channel-group 1
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#

Related Commands

no
Removes the channel group to which this port belongs
7.34.2.4 description

interface-config-instance

Configures a description for this Ethernet port

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
description [<LINE>|<WORD>]

Parameters
- description [<LINE>|<WORD>]

<table>
<thead>
<tr>
<th>&lt;LINE&gt;</th>
<th>Configures the maximum length (number of characters) of the interface description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt;</td>
<td>Configures a unique description for this interface. The description should not exceed the length specified by the &lt;LINE&gt; parameter.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#description "This is GigabitEthernet interface for Royal King"
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#show context interface ge1
description "This is GigabitEthernet interface for Royal King"
ip dhcp trust
go trust dscp
go trust 802.1p
cultural-group 1
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#

Related Commands

no
Removes the interface description
7.1.34.2.5 dot1x (authenticator)

interface-config-instance

Configures 802.1X authenticator settings.

Dot1x (or 802.1x) is an IEEE standard for network authentication. It enables media-level (layer 2) access control, providing the capability to permit or deny connectivity based on user or device identity. Dot1x allows port-based access using authentication. An dot1x enabled port can be dynamically enabled or disabled depending on user identity or device connection.

Devices supporting dot1x allow the automatic provision and connection to the wireless network without launching a Web browser at login. When within range of a dot1x network, a device automatically connects and authenticates without needing to manually login.

Before authentication, the endpoint is unknown, and traffic is blocked. Upon authentication, the endpoint is known and traffic is allowed. The controller or service platform uses source MAC filtering to ensure only the authenticated endpoint is allowed to send traffic.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax

dot1x authenticator [guest-vlan|host-mode|max-reauth-req|port-control|reauthenticate|timeout]
dot1x authenticator [guest-vlan <1-4094>|host-mode [multi-host|single-host]|
max-reauth-req <1-10>|port-control [auto|force-authorized|force-unauthorized]|
reauthenticate|timeout [quiet-period|reauth-period] <1-65535>]

NOTE: The dot1x (802.1x) supplicant settings are documented in the next section.

Parameters

- dot1x authenticator [guest-vlan <1-4094>|host-mode [multi-host|single-host]|
max-reauth-req <1-10>|port-control [auto|force-authorized|force-unauthorized]|
reauthenticate|timeout [quiet-period|reauth-period]]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dot1x authenticator</td>
<td>Configures 802.1x authenticator settings</td>
</tr>
<tr>
<td>guest-vlan &lt;1-4094&gt;</td>
<td>Configures the guest VLAN for this interface. This is the VLAN, traffic is bridged on if this port is unauthorized and the guest VLAN is globally enabled. Select the VLAN index from 1 - 4094.</td>
</tr>
</tbody>
</table>
| host-mode [multi-host|single-host] | Configures the host mode for this interface
  • multi-host – Configures multiple host mode
  • single-host – Configures single host mode. This is the default setting. |
| max-reauth-req <1-10>      | Configures maximum number of re-authorization retries for the supplicant. This is the maximum number of re-authentication attempts made before this port is moved to unauthorized.
  • <1-10> – Specify a value from 1 -10. The default is 2. |
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables or reverts interface settings to their default</td>
</tr>
</tbody>
</table>

### Examples

```
# Configuration Example
rfs4000-229D58(config-profile-testRFS4000-if-ge1)#dot1x authenticator guest-vlan 2
rfs4000-229D58(config-profile-testRFS4000-if-ge1)#dot1x authenticator host-mode multi-host
rfs4000-229D58(config-profile-testRFS4000-if-ge1)#show context
```

```
# Configuration Example of Reauthentication
rfs4000-229D58(config-profile-testRFS4000-if-ge1)#dot1x authenticator reauthenticate
```

### port-control

```
port-control [auto]
force-authorized]
force-unauthorized]
```

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures port control state</td>
</tr>
</tbody>
</table>

- **auto** – Configures auto port state
- **force-authorized** – Configures authorized port state. This is the default setting.
- **force-unauthorized** – Configures unauthorized port state

### reauthenticate

```
reauthenticate
```

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables re-authentication for this port. When enabled, clients are forced to re-authenticate on this port. The setting is disabled by default. Therefore, clients are not required to re-authenticate for connection over this port until this setting is enabled.</td>
</tr>
</tbody>
</table>

### timeout

```
timeout [quiet-period] reauth-period <1-65535>
```

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures timeout settings for this interface</td>
</tr>
</tbody>
</table>

- **quiet-period** – Configures the quiet period timeout in seconds. This is the interval, in seconds, between successive client authentication attempts.
- **reauth-period** – Configures the time after which re-authentication is initiated

The following option is common to ‘quiet-period’ and ‘reauth-period’ keywords:
- `<1-65535>` – Specify a ‘quiet-period’ or ‘reauth-period’ from 1 - 65535 seconds.
7.1.34.2.6 dot1x (supplicant)

Configure 802.1X supplicant (client) settings

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax

dot1x supplicant username <USERNAME> password [0 <WORD>|2 <WORD>|<WORD>]

Parameters
- dot1x supplicant username <USERNAME> password [0 <WORD>|2 <WORD>|<WORD>]

<table>
<thead>
<tr>
<th>dot1x supplicant</th>
<th>Configures 802.1x supplicant settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>username &lt;USERNAME&gt;</td>
<td>Sets the username for authentication</td>
</tr>
<tr>
<td>password [0 &lt;WORD&gt;</td>
<td>2 &lt;WORD&gt;</td>
</tr>
<tr>
<td></td>
<td>• 0 &lt;WORD&gt; – Sets a clear text password</td>
</tr>
<tr>
<td></td>
<td>• 2 &lt;WORD&gt; – Sets an encrypted password</td>
</tr>
<tr>
<td></td>
<td>• &lt;WORD&gt; – Specify the password.</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58(config-profile-testRFS4000-if-ge1)#dot1x supplicant username bob password 0 test@123

rfs4000-229D58(config-profile-testRFS4000-if-ge1)#show context

interface ge1
  dot1x supplicant username bob password 0 test@123
  dot1x authenticator host-mode multi-host
  dot1x authenticator guest-vlan 2
  dot1x authenticator reauthenticate
  dot1x authenticator max-reauth-count 6
  ip dhcp trust
  qos trust dscp
  qos trust 802.1p

rfs4000-229D58(config-profile-testRFS4000-if-ge1)#

Related Commands

no Removes 802.1X supplicant (client) settings
7.134.2.7 duplex

Configures duplex mode (for the flow of packets) on this Ethernet port.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

duplex [auto|half|full]

Parameters

- duplex [auto|half|full]

<table>
<thead>
<tr>
<th>auto</th>
<th>Enables automatic duplexity on an interface port. The port automatically detects whether it should run in full or half-duplex mode. (default setting)</th>
</tr>
</thead>
<tbody>
<tr>
<td>half</td>
<td>Sets the port to half-duplex mode. Allows communication in one direction only at any given time. When selected, data is sent over the port, then immediately data is received from the direction in which the data was transmitted.</td>
</tr>
<tr>
<td>full</td>
<td>Sets the port to full-duplex mode. Allows communication in both directions simultaneously. When selected, the port can send data while receiving data as well.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#duplex full

rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#show context
interface ge1
description "This is GigabitEthernet interface for Royal King"
duplex full
dot1x supplicant username Bob password 0 test@123
ip dhcp trust
qos trust dscp
qos trust 802.1p
channel-group 1
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#

Related Commands

- no | Reverts to default (auto) |
### 7.1.34.2.8 ip

**interface-config-instance**

Sets the ARP and DHCP components for this Ethernet port

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ip [arp|dhcp]
ip [arp [header-mismatch-validation|trust]|dhcp trust]
```

**Parameters**

- `ip [arp [header-mismatch-validation|trust]|dhcp trust]`

| arp [header-mismatch-validation|trust] | Configures ARP packet settings |
|--------------------------------------|-------------------------------|
| • header-mismatch-validation – Enables matching of source MAC address in the ARP and Ethernet headers to check for mismatch. This option is disabled by default. |
| • trust – Enables trust state for ARP responses on this interface. When enabled, ARP packets received on this port are considered trusted and information from these packets is used to identify rogue devices within the network. This option is disabled by default. |

| dhcp trust | Enables trust state for DHCP responses on this interface. When enabled, only DHCP responses are trusted and forwarded on this port, and a DHCP server can be connected only to a DHCP trusted port. This option is enabled by default. |

**Examples**

```
  rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#ip dhcp trust
  rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#ip arp header-mismatch-validation
  rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#show context
  interface ge1
description "This is GigabitEthernet interface for Royal King"
duplex full
dot1x supplicant username Bob password 0 test@123
ip dhcp trust
ip arp header-mismatch-validation
qos trust dscp
qos trust 802.1p
channel-group 1
  rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#
```

**Related Commands**

| no | Removes the ARP and DHCP components configured for this interface |
interface-config-instance

Sets the DHCPv6 and ICMPv6 neighbor discovery (ND) components for this interface

The ICMPv6 ND protocol uses ICMP messages and solicited multicast addresses to track neighboring devices on the same local network. These messages are used to discover a neighbor's link layer address and to verify if a neighboring device is reachable.

The ICMP messages are neighbor solicitation (NS) and neighbor advertisement (NA) messages. When a destination host receives an NS message from a neighbor, it replies back with a NA. The NA contains the following information:

- Source address – This is the IPv6 address of the device sending the NA
- Destination address – This is the IPv6 address of the device from whom the NS message is received
- Data portion – Includes the link layer address of the device sending the NA

NS messages are used to verify a neighbor’s (whose link layer address is known) reachability. To confirm a neighbor’s reachability a node sends an NS message in which the neighbor’s unicast address is specified as the destination address. If the neighbor sends back an acknowledgment on receipt of the NS message it is considered reachable.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ipv6 [dhcpv6|nd]
ipv6 dhcpv6 trust
ipv6 nd [header-mismatch-validation|raguard|trust]

Parameters

- ipv6 dhcpv6 trust Enables trust state for DHCPv6 responses on this interface. When enabled, all DHCPv6 responses received on this port are trusted and forwarded. This option is enabled by default.
  
  Note: A DHCPv6 server can be connected to a DHCPv6 trusted port.

- ipv6 nd [header-mismatch-validation|raguard|trust]

  header-mismatch-validation Enables matching of source MAC address in the ICMPv6 ND and Ethernet headers (link layer option) to check for mismatch. This option is disabled by default.
### Examples

```
rfs7000-6DCD4B(config-device-B4-C7-99-6D-CD-4B-if-ge1)#ipv6 dhcpv6 trust
rfs7000-6DCD4B(config-device-B4-C7-99-6D-CD-4B-if-ge1)#ipv6 nd header-mismatch-validation
rfs7000-6DCD4B(config-device-B4-C7-99-6D-CD-4B-if-ge1)#ipv6 nd trust
rfs7000-6DCD4B(config-device-B4-C7-99-6D-CD-4B-if-ge1)#show context
   interface ge1
      switchport mode access
      switchport access vlan 1
      ipv6 nd trust
      ipv6 nd header-mismatch-validation
      ipv6 dhcpv6 trust
rfs7000-6DCD4B(config-device-B4-C7-99-6D-CD-4B-if-ge1)#
```

### Related Commands

- **no**: Removes or reverts IPv6 settings on this interface.
### 7.1.34.2.10 lldp

**interface-config-instance**

Configures *Link Local Discovery Protocol (LLDP)* parameters on this Ethernet port.

**Supported in the following platforms:**
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**
```
lldp [receive|transmit]
```

**Parameters**
- lldp [receive|transmit]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>receive</td>
<td>Enables LLDP <em>Protocol Data Units (PDUs)</em> snooping. When enabled, the port receives periodic updates from a multicast address informing about presence of neighbors. This option is enabled by default.</td>
</tr>
<tr>
<td>transmit</td>
<td>Enables LLDP PDU transmission. When enabled, the port sends out periodic interface updates to a multicast address to advertise its presence to neighbors. This option is enabled by default.</td>
</tr>
</tbody>
</table>

**Examples**
```
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#lldp transmit
```

**Related Commands**
```
no
```

Disables or reverts interface settings to their default.
7.1.34.2.11 mac-auth

*interface-config-instance*

Enables authentication of MAC addresses on the selected wired port. When enabled, this feature authenticates the MAC address of a device, connecting to this interface, with a RADIUS server. When successfully authenticated, packets from the source are processed. Since only one MAC address is supported per wired port, packets from all other sources are dropped.

For more information on enabling this feature, see `mac-auth`.

Enable port MAC authentication in conjunction with Wired 802.1x settings to configure a MAC authentication AAA policy.

This option is also available in the device configuration mode.

Supported in the following platforms:
- Access Points — AP622, AP6522 AP6562, AP71XX, AP7502, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**
```
mac-auth
```

**Parameters**
None

**Examples**
```
rf4000-229D58(config-profile-testRFS4000-if-ge1)#mac-auth

rf4000-229D58(config-profile-testRFS4000-if-ge1)#show context
interface ge1
    mac-auth
    ip dhcp trust
    qos trust dscp
    qos trust 802.1p
    channel-group 1
rf4000-229D58(config-profile-testRFS4000-if-ge1)#

rf4000-229D58(config-profile-testRFS4000-if-ge5)#mac-auth

rf4000-229D58(config-device-00-23-68-22-9D-58-if-ge5)#show context
interface ge5
    switchport mode access
    switchport access vlan 1
    dot1x authenticator host-mode single-host
    dot1x authenticator guest-vlan 5
    dot1x authenticator port-control auto
    mac-auth
rf4000-229D58(config-device-00-23-68-22-9D-58-if-ge5)#
```

**Related Commands**
```
no
```
Disables authentication of MAC addresses on the selected wired port
7.1.34.2.12 no

Removes or reverts the selected Ethernet port settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [captive-portal-enforcement|cdp|channel-group|description|dot1x|duplex|ip|ipv6|lldp|mac-auth|power|qos|shutdown|spanning-tree|speed|switchport|use]

no [captive-portal-enforcement|channel-group|description|duplex|mac-auth|shutdown|speed]

no [cdp|lldp] [receive|transmit]

no dot1x [authenticator [guest-vlan|host-mode|max-reauth-req|port-control|reauthentication|timeout [quiet-period|reauth-period]]|supplicant]

no ip [arp [header-mismatch-validation|trust]|dhcp trust]

no ipv6 [dhcpv6 trust|nd [header-mismatch-validation|raguard|trust]]

no power {best-effort|limit|priority}

no qos trust [802.1p|cos|dscp]

no spanning-tree [bpdufilter|bpduguard|force-version|guard|link-type|mst|portfast]

no switchport [access vlan|mode|trunk native tagged]

no use [ip-access-list|ipv6-access-list|mac-access-list] in

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes or reverts this Ethernet port settings based on the parameters passed |

Usage Guidelines

The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

Examples

rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#no cdp
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#no duplex
7.1.34.2.13 power

Configures PoE settings on this interface.

When configured, this option allows the selected port to use Power over Ethernet. When enabled, the controller supports 802.3af PoE on each of its GE ports. PoE allows users to monitor port power consumption and configure power usage limits and priorities for each GE port.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

```
power {best-effort|limit <0-40>|priority [critical|high|low]}
```

Parameters

- `power {best-effort|limit <0-40>|priority [critical|high|low]}`

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>power</td>
<td>Configures power related thresholds for this interface</td>
</tr>
<tr>
<td>best-effort</td>
<td>Optional. Enables power when the device is not operating from 802.3at class 4 power source</td>
</tr>
<tr>
<td>limit &lt;0-40&gt;</td>
<td>Optional. Configures the PoE power limit from 0 - 40 Watts. The default is 30 Watts.</td>
</tr>
<tr>
<td>priority [critical</td>
<td>high</td>
</tr>
<tr>
<td></td>
<td>- critical – Sets PoE priority as critical</td>
</tr>
<tr>
<td></td>
<td>- high – Sets PoE priority as high</td>
</tr>
<tr>
<td></td>
<td>- low – Sets PoE priority as low. This is the default setting.</td>
</tr>
</tbody>
</table>

Examples

```
rfs4000-229D58(config-profile-testRFS4000-if-ge1)#power limit 30
rfs4000-229D58(config-profile-testRFS4000-if-ge1)#power priority critical
rfs4000-229D58(config-profile-testRFS4000-if-ge1)#show context
interface ge1
  ip dhcp trust
  qos trust dscp
  qos trust 802.1p
  power limit 30
  power priority critical
rfs4000-229D58(config-profile-testRFS4000-if-ge1)#
```

Related Commands

```
no
```

Removes PoE settings on this interface.
7.1.34.2.14 qos

Defines Quality of Service (QoS) settings on this Ethernet port

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
qos trust [802.1p|cos|dscp]

Parameters
- qos trust [802.1p|cos|dscp]

| trust [802.1p|cos|dscp] | Trusts QoS values ingressing on this interface |
|--------------------------|-----------------------------------------------|
| 802.1p                   | 802.1p – Trusts 802.1p COS values ingressing on this interface |
| cos                      | cos – Trusts 802.1p COS values ingressing on this interface. This option is enabled by default. |
| dscp                     | dscp – Trusts IP DSCP QOS values ingressing on this interface. This option is enabled by default. |

Examples
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#qos trust dscp
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#qos trust 802.1p
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#show context
interface ge1
description "This is GigabitEthernet interface for Royal King"
duplex full
dot1x supplicant username Bob password 0 test@123
ip dhcp trust
ip arp header-mismatch-validation
qos trust dscp
qos trust 802.1p
channel-group 1
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#

Related Commands
- no | Removes QoS settings on the selected interface
7.1.34.2.15 shutdown

interface-config-instance

Shuts down (disables) an interface. The interface is administratively enabled unless explicitly disabled using this command.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
shut down

Parameters
None

Examples
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#shutdown

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables or reverts interface settings to their default</td>
</tr>
</tbody>
</table>
7.1.34.2.16 spanning-tree

Configure spanning tree parameters

Supported platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

spanning-tree [bpdufilter|bpduguard|force-version|guard|link-type|mst|port-cisco-interoperability|portfast]
spanning-tree [force-version <0-3>|guard root|portfast]
spanning-tree [bpdufilter|bpduguard] [default|disable|enable]
spanning-tree link-type [point-to-point|shared]
spanning-tree mst <0-15> [cost <1-200000000>|port-priority <0-240>]
spanning-tree port-cisco-interoperability [disable|enable]

Parameters

- spanning-tree [force-version <0-3>|guard root|portfast]

### force-version <0-3>
Specifies the spanning tree force version. A version identifier of less than 2 enforces the spanning tree protocol. Select one of the following versions:
- 0 – Spanning Tree Protocol (STP)
- 1 – Not supported
- 2 – Rapid Spanning tree Protocol (RSTP)
- 3 – Multiple Spanning Tree Protocol (MSTP). This is the default setting

### guard root
Enables Root Guard for the port
The Root Guard disables superior Bridge Protocol Data Unit (BPDU) reception. The Root Guard ensures the enabled port is a designated port. If the Root Guard enabled port receives a superior BPDU, it moves to a discarding state (root-inconsistent STP state). This state is equivalent to a listening state, and data is not forwarded across the port. Therefore, enabling the guard root enforces the root bridge position. Use the no parameter with this command to disable the Root Guard.

### portfast
Enables rapid transitions. Enabling PortFast allows the port to bypass the listening and learning states.

- spanning-tree [bpdufilter|bpduguard] [default|disable|enable]

### bpdufilter
Sets a PortFast BPDU filter for the port
Use the no parameter with this command to revert the port BPDU filter to its default. The spanning tree protocol sends BPDU from all ports. Enabling the BPDU filter ensures PortFast enabled ports do not transmit or receive BPDU.
**Profiles 7-193**

- **spanning-tree link-type** [point-to-point|shared]
  - **link-type** [point-to-point|shared] Enables point-to-point or shared link types
    - point-to-point – Enables rapid transition. This option indicates the port should be treated as connected to a point-to-point link. A port connected to a controller is a point-to-point link.
    - shared – Disables rapid transition. This option indicates this port should be treated as having a shared connection. A port connected to a hub is on a shared link.

- **spanning-tree mst <0-15> [cost <1-200000000>|port-priority <0-240>]
  - **mst <0-15>** Configures MST on a spanning tree
  - **cost <1-200000000>** Defines path cost for a port from 1 - 200000000. The default path cost depends on the speed of the port. The cost helps determine the role of the port in the MSTP network. The designated cost is the cost for a packet to travel from this port to the root in the MSTP configuration. The slower the media, the higher the cost.
  - **port-priority <0-240>** Defines port priority for a bridge from 1 - 240. Lower the priority greater is the likelihood of the port becoming a designated port. Applying a higher value impacts the port’s likelihood of becoming a designated port.

- **spanning-tree port-cisco-interoperability** [disable|enable]
  - **port-cisco-interoperability** Enables interoperability with Cisco’s version of MSTP (which is incompatible with standard MSTP)
  - **enable** Enables CISCO Interoperability
  - **disable** Disables CISCO Interoperability. The default is disabled.

**Examples**
- `rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#spanning-tree bpduguard disable`
- `rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#spanning-tree bpduguard enable`
- `rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#spanning-tree force-version 1`
- `rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#spanning-tree guard root`
- `rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#spanning-tree mst 2 port-priority 10`
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#show context
  interface ge1
    description "This is GigabitEthernet interface for Royal King"
    duplex full
    spanning-tree bpduguard enable
    spanning-tree bpdufilter disable
    spanning-tree force-version 1
    spanning-tree guard root
    spanning-tree mst 2 port-priority 10
    --More--
    rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#

Related Commands

<table>
<thead>
<tr>
<th>command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes spanning tree settings configured on this interface</td>
</tr>
</tbody>
</table>
7.1.34.2.17 speed

Specifies the speed of a FastEthernet (10/100) or GigabitEthernet (10/100/1000) port. This is the speed at which the port can receive and transmit the data.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

speed [10|100|1000|auto]

Parameters

- speed [10|100|1000|auto]

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Forces 10 Mbps operation</td>
</tr>
<tr>
<td>100</td>
<td>Forces 100 Mbps operation</td>
</tr>
<tr>
<td>1000</td>
<td>Forces 1000 Mbps operation</td>
</tr>
<tr>
<td>auto</td>
<td>Port automatically detects its operational speed based on the port at the other end of the link. Select this option to enable the port to automatically exchange information about data transmission speed and duplex capabilities. Auto negotiation is helpful when in an environment where different devices are connected and disconnected on a regular basis.</td>
</tr>
</tbody>
</table>

Usage Guidelines

Set the interface speed to auto detect and use the fastest speed available. Speed detection is based on connected network hardware.

Examples

rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#speed 10

rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#show context

interface ge1
description "This is GigabitEthernet interface for Royal King"
speed 10
duplex full
spanning-tree bpduguard enable
spanning-tree bpdufilter disable
spanning-tree force-version 1
spanning-tree guard root
spanning-tree mst 2 port-priority 10
dot1x supplicant username Bob password 0 test@123
ip dhcp trust
ip arp header-mismatch-validation
qos trust dscp
qos trust 802.1p
channel-group 1
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#

Related Commands

no | Resets speed to default (auto)
7.1.34.2.18 switchport

Sets switching mode characteristics for the selected interface

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
switchport [access|mode|trunk]
```

```
switchport access vlan [<1-4094>|<VLAN-ALIAS-NAME>]
```

```
switchport mode [access|trunk]
```

```
switchport trunk [allowed|native]
```

```
switchport trunk allowed vlan [<VLAN-ID>|add <VLAN-ID>|none|remove <VLAN-ID>]
```

```
switchport trunk native [tagged|vlan [<1-4094>|<VLAN-ALIAS-NAME>]]
```

Parameters

- **switchport access vlan [<1-4094>|<VLAN-ALIAS-NAME>]**
  
  Sets the VLAN when interface is in the access mode. You can either directly specify the native VLAN ID or use a VLAN alias to identify the native VLAN.

  - `<1-4094>` – Specify the SVI VLAN ID from 1 - 4094.
  - `<VLAN-ALIAS-NAME>` – Specify the VLAN alias name (should be existing and configured).

  An Ethernet port in the access mode accepts packets only from the native VLAN. Frames are forwarded out the port untagged with no 802.1Q header. All frames received on the port are expected as untagged and are mapped to the native VLAN.

- **switchport mode [access|trunk]**

  Sets the interface’s switching mode to access or trunk (can only be used on physical - layer 2 - interfaces)

  - **access** – If access mode is selected, the access VLAN is automatically set to VLAN1. In this mode, only untagged packets in the access VLAN (vlan1) are accepted on this port. All tagged packets are discarded.
  - **trunk** – If trunk mode is selected, tagged VLAN packets are accepted. The native VLAN is automatically set to VLAN1. Untagged packets are placed in the native VLAN by the wireless controller or service platform. Outgoing packets in the native VLAN are sent untagged. The default mode for both ports is trunk.

- **switchport trunk allowed vlan [<VLAN-ID>|add <VLAN-ID>|none|remove <VLAN-ID>]**

  Sets trunking mode, allowed VLANs characteristics of the port. Use this option to add VLANs that exclusively send packets over the listed port.

- **switchport trunk native [tagged|vlan [<1-4094>|<VLAN-ALIAS-NAME>]]**

  Sets allowed VLAN options. The options are:

  - `<VLAN-ID>` – Allows a group of VLAN IDs. Specify the VLAN IDs, can be either a range (55-60) or a comma-separated list (35, 41, etc.)
  - none – Allows no VLANs to transmit or receive through the layer 2 interface

Contd..
### switchport trunk native [tagged|vlan [<1-4094>|<VLAN-ALIAS-NAME>]]

**Trunk**

Sets trunking mode characteristics of the switchport

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The native VLAN allows an Ethernet device to associate untagged frames to a VLAN when no 802.1Q frame is included in the frame. Additionally, the native VLAN is the VLAN untagged traffic is directed over when using a port in trunk mode.</td>
<td></td>
</tr>
<tr>
<td>• tagged – Tags the native VLAN. When a frame is tagged, the 12 bit frame VLAN ID is added to the 802.1Q header enabling upstream Ethernet devices to know which VLAN ID the frame belongs to. The device reads the 12 bit VLAN ID and forwards the frame to the appropriate VLAN. When a frame is received with no 802.1Q header, the upstream device classifies the frame using the default or native VLAN assigned to the Trunk port. A native VLAN allows an Ethernet device to associate untagged frames to a VLAN when no 802.1Q frame is included in the frame.</td>
<td></td>
</tr>
<tr>
<td>• vlan [&lt;1-4094&gt;</td>
<td>&lt;VLAN-ALIAS-NAME&gt;] – Sets the native VLAN for classifying untagged traffic when the interface is in trunking mode.</td>
</tr>
<tr>
<td>• &lt;1-4094&gt; – Specify a value from 1 - 4094.</td>
<td></td>
</tr>
<tr>
<td>• &lt;VLAN-ALIAS-NAME&gt; – Specify the VLAN alias name used to identify the VLANs. The VLAN alias should be existing and configured.</td>
<td></td>
</tr>
</tbody>
</table>

**Usage Guidelines**

Interfaces ge1 - ge4 can be configured as trunk or in access mode. An interface configured as "trunk" allows packets (from the given list of VLANs) to be added to the trunk. An interface configured as "access" allows packets only from native VLANs.

Use the [no] switchport (access|mode|trunk) to undo switchport configurations.

**Examples**

```bash
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#switchport trunk native tagged
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#switchport access vlan 1
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#show context interface ge1
description "This is GigabitEthernet interface for Royal King"
speed 10
duplex full
switchport mode access
switchport access vlan 1
spanning-tree bpduguard enable
spanning-tree bpdufilter disable
```

**Related Commands**

| no | Disables or reverts interface settings to their default |
7.1.34.2.19 use

interface-config-instance

Specifies the IP (IPv4 and IPv6) access list and MAC access list used with this Ethernet port. The associated ACL firewall inspects IP and MAC traffic flows and detects attacks typically not visible to traditional wired firewall appliances.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

use [ip-access-list in <IPv4-ACCESS-LIST-NAME>|ipv6-access-list <IPv6-ACCESS-LIST-NAME>|mac-access-list in <MAC-ACCESS-LIST-NAME>]

Parameters

- use [ip-access-list in <IPv4-ACCESS-LIST-NAME>|ipv6-access-list <IPv6-ACCESS-LIST-NAME>|mac-access-list in <MAC-ACCESS-LIST-NAME>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| ip-access-list in <IPv4-ACCESS-LIST-NAME> | Associates an IPv4 access list with this Ethernet port. IPv4 is a connectionless protocol for packet switched networking. IPv4 operates as a best effort delivery method, as it does not guarantee delivery, and does not ensure proper sequencing or duplicate delivery (unlike TCP). IPv4 hosts can use link local addressing to provide local connectivity.  
  - in – Applies the IPv4 ACL on incoming packets  
  - <IPv4-ACCESS-LIST-NAME> – Specify the IPv4 access list name (it should be an existing and configured). |
| ipv6-access-list in <IPv6-ACCESS-LIST-NAME> | Associates an IPv6 access list with this Ethernet port. IPv6 is the latest revision of the IP designed to replace IPv4. IPv6 provides enhanced identification and location information for computers on networks routing traffic across the Internet. IPv6 addresses are composed of eight groups of four hexadecimal digits separated by colons.  
  - in – Applies the IPv6 ACL on incoming packets  
  - <IPv6-ACCESS-LIST-NAME> – Specify the IPv6 access list name (it should be an existing and configured). |
| mac-access-list in <MAC-ACCESS-LIST-NAME> | Associates a MAC access list with this Ethernet port. MAC ACLs filter/mark packets based on the MAC address from which they arrive, as opposed to filtering packets on layer 2 ports.  
  - in – Applies the MAC ACL on incoming packets  
  - <MAC-ACCESS-LIST-NAME> – Specify the MAC access list name (it should be an existing and configured). |

Examples

rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#use mac-access-list in test
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#use ip-access-list in test
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#show context
interface ge1
description "This is GigabitEthernet interface for Royal King"
speed 10
duplex full
switchport mode accessi
switchport access vlan 1
use ip-access-list in test
use mac-access-list in test
spanning-tree bpduguard enable
spanning-tree bpdufilter disable
spanning-tree force-version 1
--More--
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disassociates the IP access list or MAC access list from the interface</td>
</tr>
</tbody>
</table>
7.1.34.3 interface-config-vlan-instance

Use the config-profile-<DEVICE-PROFILE-NAME> mode to configure Ethernet, VLAN and tunnel settings.

To switch to this mode, use the following commands:

```
<DEVICE>(config-profile-default-<DEVICE-TYPE>)#interface [<INTERFACE-NAME>|fe <1-4>| ge <1-24>|me1|port-channel <1-4>|pppoel|radio [1|2|3]|up1|vlan <1-4094>|wwan1| xge <1-24>]
```

The following example uses the config-profile-default-rfs7000 instance to configure a VLAN interface:

```
rfs7000-37FABE(config-profile-default-rfs7000)#interface vlan 8
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#
```

SVI configuration commands:

- `crypto` Encryption module
- `description` Vlan description
- `dhcp` Dynamic Host Configuration Protocol (DHCP)
- `dhcp-relay-incoming` Allows on-board DHCP server to respond to relayed DHCP packets on this interface
- `ip` Interface Internet Protocol config commands
- `ipv6` Internet Protocol version 6 (IPv6)
- `no` Negate a command or set its defaults
- `shutdown` Shutdown the selected interface
- `use` Set setting to use
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#?
```

The following table summarizes interface VLAN configuration commands:

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>crypto</td>
<td>Defines the encryption module used with this VLAN interface</td>
<td>page 7-201</td>
</tr>
<tr>
<td>description</td>
<td>Defines the VLAN interface description</td>
<td>page 7-202</td>
</tr>
<tr>
<td>dhcp</td>
<td>Enables inclusion of optional fields (client identifier) in DHCP client requests</td>
<td>page 7-203</td>
</tr>
<tr>
<td>dhcp-relay-incoming</td>
<td>Allows an onboard DHCP server to respond to relayed DHCP packets on this interface</td>
<td>page 7-204</td>
</tr>
<tr>
<td>ip</td>
<td>Configures the VLAN interface’s IP settings</td>
<td>page 7-205</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures the VLAN interface’s IPv6 settings</td>
<td>page 7-208</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts this VLAN interface’s settings to default</td>
<td>page 7-210</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down this VLAN interface</td>
<td>page 7-215</td>
</tr>
<tr>
<td>use</td>
<td>Associates an IP (IPv4 and IPv6) access list, bonjour-gw-discovery policy, and an IPv6-route-advertisement policy with this VLAN interface</td>
<td>page 7-216</td>
</tr>
</tbody>
</table>

Table 7.15 VLAN Interface Config Mode Commands
7.1.34.3.1 crypto

 Associates an existing and configured VPN crypto map with this VLAN interface.
Cryo map entries are sets of configuration parameters for encrypting packets that pass through the VPN tunnel.
For more information on crypto maps, see crypto-map-config-commands.
Supported in the following platforms:
• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
crypto map <CRYPTO-MAP-NAME>

Parameters
• crypto map <CRYPTO-MAP-NAME>

Examples
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#crypto map map1
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#show context
   interface vlan8
       crypto map map1
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#

Related Commands
no Disables or reverts interface VLAN settings to their default
7.1.34.3.2 description

interface-config-vlan-instance

Defines this VLAN interface’s description. Use this command to provide additional information about the VLAN.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

description <WORD>

Parameters

- description <WORD>

Examples

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#description "This VLAN interface is configured for the Sales Team"

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#show context interface vlan8
description "This VLAN interface is configured for the Sales Team"
crypto map map1
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#

Related Commands

no Removes the VLAN interface description
7.1.34.3.3 dhcp

Enables inclusion of optional fields (client identifier) in DHCP client requests. This option is disabled by default. Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dhcp client include client-identifier

Parameters

- dhcp client include client-identifier

<table>
<thead>
<tr>
<th>dhcp client include client-identifier</th>
<th>Enables inclusion of client identifier in DHCP client requests</th>
</tr>
</thead>
</table>

Examples

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#dhcp client include client-identifier

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#show context
  interface vlan8
    dhcp client include client-identifier

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#

Related Commands

- no
  | Disables inclusion of client identifier in DHCP client requests |
7.1.34.3.4 dhcp-relay-incoming

`interface-config-vlan-instance`

Allows an onboard DHCP server to respond to relayed DHCP packets. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
dhcp-relay-incoming

Parameters
None

Examples
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#dhcp-relay-incoming

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#show context
interface vlan8
description "This VLAN interface is configured for the Sales Team"
crypto map map1
dhcp-relay-incoming
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables or reverts interface VLAN settings to their default</td>
</tr>
</tbody>
</table>
### 7.1.34.3.5 ip

#### interface-config-vlan-instance

Configures the VLAN interface's IP settings

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
ip [address|dhcp|helper-address|nat|ospf]

ip helper-address <IP>

ip address [<IP/M>|<NETWORK-ALIAS-NAME>|dhcp|zeroconf] {secondary}

ip dhcp

ip dhcp client request options all

ip nat [inside|outside]

ip ospf [authentication|authentication-key|bandwidth|cost|message-digest-key|priority]

ip ospf authentication [message-digest|null|simple-password]

ip ospf authentication-key simple-password [0 <WORD>|2 <WORD>]

ip ospf [bandwidth <1-10000000>|cost <1-65535>|priority <0-255>]

ip ospf message-digest-key key-id <1-255> md5 [0 <WORD>|2 <WORD>]
```

#### Parameters

- **ip helper-address <IP>**
  
  Enables DHCP and BOOTP requests forwarding for a set of clients. Configure a helper address on the VLAN interface connected to the client. The helper address should specify the address of the BOOTP or DHCP servers to receive the requests. If you have multiple servers, configure one helper address for each server.
  
  - <IP> – Specify the IP address of the DHCP or BOOTP server.

- **ip address [<IP/M>|<NETWORK-ALIAS-NAME>|zeroconf] {secondary}**
  
  Sets the VLAN interface's IP address
  
  - <IP> – Interface IP address
  - <NETWORK-ALIAS-NAME> – Pre-defined network alias name
  - zeroconf – Uses Zero Configuration Networking (zeroconf) to generate an IP address

Contd..
Zero configuration can be a means of providing a primary or secondary IP addresses for the virtual interface. Zero configuration (or zero config) is a wireless connection utility included with Microsoft Windows XP and later as a service dynamically selecting a network to connect based on a user's preferences and various default settings. Zero config can be used instead of a wireless network utility from the manufacturer of a computer's wireless networking device.

- secondary – Optional. Sets the generated IP address as a secondary address

**ip address dhcp**

| address | Sets the VLAN interface's IP address |
| dhcp    | Uses a DHCP client to obtain an IP address for this VLAN interface |

**ip dhcp client request options all**

| dhcp     | Uses a DHCP client to configure a request on this VLAN interface |
| client   | Configures a DHCP client |
| request  | Configures DHCP client request |
| options  | Configures DHCP client request options |
| all      | Configures all DHCP client request options |

**ip nat [inside|outside]**

| nat [inside|outside] | Defines NAT settings for the VLAN interface. NAT is disabled by default. |
|                   | • inside – Enables NAT on the inside interface. The inside network is transmitting data over the network to the intended destination. On the way out, the source IP address is changed in the header and replaced by the (public) IP address. |
|                   | • outside – Enables NAT on the outside interface. Packets passing through the NAT on the way back to the managed LAN are searched against the records kept by the NAT engine. There, the destination IP address is changed back to the specific internal private class IP address in order to reach the LAN over the network |

**ip ospf authentication [message-digest|null|simple-password]**

| ospf authentication | Configures OSPF authentication scheme. Options are message-digest, null, and simple-password. |
| message-digest      | Configures md5 based authentication |
| null                | No authentication required |
| simple-password     | Configures simple password based authentication |

**ip ospf authentication-key simple-password [0 <WORD>|2 <WORD>]**

| ospf authentication-key | Configures an OSPF authentication key |
| simple-password [0 <WORD>|2 <WORD>] | Configures a simple password OSPF authentication key |
|                        | • 0 <WORD> – Configures clear text key |
|                        | • 2 <WORD> – Configures encrypted key |
- ip ospf [bandwidth <1-10000000>|cost <1-65535>|priority <0-255>]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bandwidth &lt;1-10000000&gt;</td>
<td>Configures bandwidth for the physical port mapped to this layer 3 interface. Specify the bandwidth from 1 - 10000000.</td>
</tr>
<tr>
<td>cost &lt;1-65535&gt;</td>
<td>Configures OSPF cost. Specify OSPF cost value from 1 - 65535.</td>
</tr>
<tr>
<td>priority &lt;0-255&gt;</td>
<td>Configures OSPF priority. Specify OSPF priority value from 0 - 255.</td>
</tr>
</tbody>
</table>

- ip ospf message-digest-key key-id <1-255> md5 [0 <WORD>|2 <WORD>]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ospf message-digest</td>
<td>Configures message digest authentication parameters.</td>
</tr>
<tr>
<td>key-id &lt;1-255&gt;</td>
<td>Configures message digest authentication key ID from 0 - 255.</td>
</tr>
<tr>
<td>md5 [0 &lt;WORD&gt;</td>
<td>2 &lt;WORD&gt;]</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#ip address 10.0.0.1/8
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#ip nat inside
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#ip helper-address 172.16.10.3
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#ip dhcp client request options all
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#show context
    interface vlan8
        description "This VLAN interface is configured for the Sales Team"
        ip address 10.0.0.1/8
        ip dhcp client request options all
        ip helper-address 172.16.10.3
        ip nat inside
        crypto map map1
        dhcp-relay-incoming
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#
```

**Related Commands**

- no | Removes or resets IP settings on this interface
7.34.3.6 ipv6

`interface-config-vlan-instance`

Configures the VLAN interface’s IPv6 settings

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ipv6 [accept|address|dhcp|enable|enforce-dad|mtu|redirects|request-dhcpv6-options|router-advertisements]

ipv6 accept ra { (no-default-router|no-hop-limit|no-mtu)}

ipv6 address [<IPv6/M|autoconfig|eui-64|link-local|prefix-from-provider]

ipv6 address [<IPv6/M|autoconfig]

ipv6 address eui-64 [<IPv6/M|prefix-from-provider <WORD> <IPv6-PREFIX/PREFIX-LENGTH>]

ipv6 address prefix-from-provider <WORD> <HOST-PORTION/LENGTH>

ipv6 address link-local <LINK-LOCAL-ADD>

ipv6 dhcp [client [information|prefix-from-provider <WORD>|relay destination <DEST-IPv6-ADD>]]

ipv6 [enable|enforce-dad|mtu <1280-1500>|redirects|request-dhcpv6-options]

ipv6 router-advertisements [prefix <IPv6-PREFIX>|prefix-from-provider <WORD>]
 {no-autoconfig|off-link|site-prefix|valid-lifetime}

Parameters

- ipv6 accept ra { (no-default-router|no-hop-limit|no-mtu)}

---

<table>
<thead>
<tr>
<th>ipv6 accept ra</th>
<th>Enables processing of router advertisements (RAs) on this VLAN interface. This option is enabled by default. When enabled, IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the neighbor discovery protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to the request with a router advertisement packet containing Internet layer configuration parameters.</th>
</tr>
</thead>
<tbody>
<tr>
<td>no-default-router</td>
<td>Optional. Disables inclusion of routers on this interface in the default router selection process. This option is disabled by default.</td>
</tr>
<tr>
<td>no-hop-limit</td>
<td>Optional. Disables the use of RA advertised hop-count value on this interface. This option is disabled by default.</td>
</tr>
<tr>
<td>no-mtu</td>
<td>Optional. Disables the use of RA advertised MTU value on this interface. This option is disabled by default.</td>
</tr>
</tbody>
</table>
**ipv6 address** [<IPv6/M>|autoconfig]

<table>
<thead>
<tr>
<th>ipv6 address</th>
<th>Configures IPv6 address related settings on this VLAN interface</th>
</tr>
</thead>
</table>
| [<IPv6/M>|autoconfig] | - `<IPv6>` – Specify the non-link local static IPv6 address and prefix length of the interface in the X:X::X:X/M format.  
- `autoconfig` – Enables stateless auto-configuration of IPv6 address, based on the prefixes received from RAs (with auto-config flag set). These prefixes are used to auto-configure the IPv6 address. This option is enabled by default. Use the `no > ipv6 > address > autoconfig` command to negate the use of prefixes received in RAs. |

**ipv6 address eui-64** [<IPv6/M>|prefix-from-provider <WORD> <IPv6-PREFIX/PREFIX-LENGTH>]

<table>
<thead>
<tr>
<th>ipv6 address eui-64</th>
<th>Configures the IPv6 prefix and prefix length. This prefix is used to auto-generate the static IPv6 address (for this interface) in the modified Extended Unique Identifier (EUI)-64 format.</th>
</tr>
</thead>
<tbody>
<tr>
<td>[&lt;IPv6/M&gt;</td>
<td>Implementing the IEEE's 64-bit EUI64 format enables a host to automatically assign itself a unique 64-bit IPv6 interface identifier, without manual configuration or DHCP. This is accomplished on a virtual interface by referencing the already unique 48-bit MAC address, and reformatting it to match the EUI-64 specification.</td>
</tr>
<tr>
<td>Note: In the EUI-64 IPv6 address the prefix and host portions are each 64 bits in length.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;IPv6/M&gt;</th>
<th>Specify the IPv6 prefix and prefix length. This configured value is used as the prefix portion of the auto-generated IPv6 address, and the host portion is derived from the MAC address of the interface.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: Any bits of the configured value exceeding the prefix-length “M” are ignored and replaced by the host portion derived from the MAC address.</td>
<td></td>
</tr>
<tr>
<td>For example:</td>
<td></td>
</tr>
<tr>
<td>Prefix portion provided using this command: <code>ipv6 &gt; address &gt; eui-64 &gt; 2004:b055:15:dead::1111/64</code>.</td>
<td></td>
</tr>
<tr>
<td>Host portion derived using the interface’s MAC address (00-15-70-37-FB-5E): 215:70ff:fe37:fb5e</td>
<td></td>
</tr>
<tr>
<td>Auto-configured IPv6 address using the above prefix and host portions: 2004:b055:15:dead:215:70ff:fe37:fb5e/64</td>
<td></td>
</tr>
<tr>
<td>In this example, the host part “::1111” is ignored and replaced with the modified eui-64 formatted host address.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>prefix-from-provider &lt;WORD&gt; &lt;IPv6-PREFIX/PREFIX-LENGTH&gt;</th>
<th>Configures the “prefix-from-provider” named object and the associated IPv6 prefix and prefix length. This configured value is used as the prefix portion of the auto-generated IPv6 address, and the host portion is derived from the MAC address of the interface.</th>
</tr>
</thead>
</table>
| - `<WORD>` – Specify the IPv6 “prefix-from-provider” object’s name. This is the IPv6 general prefix (32 character maximum) name provided by the internet service provider.  
- `<IPv6-PREFIX/PREFIX-LENGTH>` – Specify the IPv6 address subnet and host parts along with prefix length (site-renumbering). |
| For example: |
| Prefix portion provided using this command: `ipv6 > address > eui-64 > prefix-from-provider > ISP1-prefix > 2002::/64` |
| Host portion derived using the interface’s MAC address (00-15-70-37-FB-5E): 215:70ff:fe37:fb5e |
| Auto-configured IPv6 address using the above prefix and host portions: 2002::215:70ff:fe37:fb5e/64 |
- `ipv6 address prefix-from-provider <WORD> <HOST-PORTION/LENGTH>`

  Configures the IPv6 address related settings on this VLAN interface.

  **prefix-from-provider**

  `<WORD> <HOST-PORTION/LENGTH>`

  Configures the “prefix-from-provider” named object and the host portion of the IPv6 interface address. The prefix derived from the specified “prefix-from-provide” and the host portion (second parameter) are combined together (using the prefix-length of the specified “prefix-from-provide”) to generate the interface’s IPv6 address.

  - `<WORD>` – Provide the “prefix-from-provider” object’s name. This is the IPv6 general prefix (32 character maximum) name provided by the service provider.
  - `<HOST-PORTION/LENGTH>` – Provide the subnet number, host portion, and prefix length used to form the actual address along with the prefix derived from the “prefix-from-provider” object identified by the `<WORD>` keyword.

- `ipv6 address link-local <LINK-LOCAL-ADD>`

  Configures IPv6 link-local address on this interface. The configured value overrides the default link-local address derived from the interface’s MAC address. Use the `no > ipv6 link-local` command to restore the default link-local address derived from MAC address.

  **Note:** It is mandatory for an IPv6 interface to always have a link-local address.

- `ipv6 dhcp [client [information|prefix-from-provider <WORD>]|relay destination <DEST-IPv6-ADD>]`

  Configures DHCPv6 client-related settings on this VLAN interface.

  **ipv6 dhcp client**

  `[information|prefix-from-provider <WORD>]`

  Configures DHCPv6 client on this interface. When enabled, the device can request configuration information from the DHCPv6 server using stateless DHCPv6. This option is disabled by default.

  - `prefix-from-provider` – Configures prefix-delegation client on this interface. Enter the IPv6 general prefix (32 character maximum) name provided by the service provider. This option is disabled by default.

  **relay destination**

  `<DEST-IPv6-ADD>`

  Enables DHCPv6 packet forwarding on this VLAN interface.

  - `destination` – Forwards DHCPv6 packets to a specified DHCPv6 relay.
  - `<DEST-IPv6-ADD>` – Specify the destination DHCPv6 relay’s address.

  **Note:** DHCPv6 relay enhances an extended DHCP relay agent by providing support in IPv6. DHCP relays exchange messages between a DHCPv6 server and client. A client and relay agent exist on the same link. When a DHCP request is received from the client, the relay agent creates a relay forward message and sends it to a specified server address. If no addresses are specified, the relay agent forwards the message to all DHCP server relay multicast addresses. The server creates a relay reply and sends it back to the relay agent. The relay agent then sends back the response to the client.

- `ipv6 [enable|enforce-dad|mtu <1280-1500>|redirects|request-dhcp-options]`

  Configures IPv6 settings on this VLAN interface.

  **ipv6**

  Enables IPv6 on this interface. This option is disabled by default.

  **enforce-dad**

  Enforces Duplicate Address Detection (DAD) on wired ports. This option is enabled by default.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mtu &lt;1280-1500&gt;</td>
<td>Configures the Maximum Transmission Unit (MTU) for IPv6 packets on this interface. The default is 1500.</td>
</tr>
<tr>
<td>redirects</td>
<td>Enables ICMPv6 redirect messages sending on this interface. This option is enabled by default.</td>
</tr>
<tr>
<td>request-dhcp-options</td>
<td>Requests options from DHCPv6 server on this interface. This option is disabled by default.</td>
</tr>
<tr>
<td>ipv6 router-advertisements</td>
<td>Configures IPv6 RA related settings on this VLAN interface</td>
</tr>
<tr>
<td>prefix &lt;IPv6-PREFIX&gt;</td>
<td>Configures a static prefix and its related parameters. The configured value is advertised on RAs.</td>
</tr>
<tr>
<td>prefix-from-provider &lt;WORD&gt;</td>
<td>Configures a static “prefix-from-provider” named object and its related parameters on this VLAN interface. The configured value is advertised on RAs.</td>
</tr>
<tr>
<td>no-autoconfig</td>
<td>This parameter is common to the “general-prefix”, “prefix”, and “prefix-from-provider” keywords.</td>
</tr>
<tr>
<td>off-link</td>
<td>This parameter is common to the “general-prefix”, “prefix”, and “prefix-from-provider” keywords.</td>
</tr>
<tr>
<td>site-prefix &lt;SITE-PREFIX&gt;</td>
<td>This parameter is common to the “general-prefix”, “prefix”, and “prefix-from-provider” keywords.</td>
</tr>
<tr>
<td>valid-lifetime [30-4294967294]</td>
<td>This parameter is common to the “general-prefix”, “prefix”, and “prefix-from-provider” keywords.</td>
</tr>
</tbody>
</table>
Examples

rfs7000-6DCD4B(config-profile-test-if-vlan4)#ipv6 enable

rfs7000-6DCD4B(config-profile-test-if-vlan4)#ipv6 accept ra no-mtu

rfs7000-6DCD4B(config-profile-test-if-vlan4)#ipv6 address eui-64 prefix-from-provider ISP1-prefix 2002::/64

rfs7000-6DCD4B(config-profile-test-if-vlan4)#show context
  interface vlan4
    ipv6 enable
    ipv6 address eui-64 prefix-from-provider ISP1-prefix 2002::/64
    ipv6 accept ra no-mtu
  rfs7000-6DCD4B(config-profile-test-if-vlan4)#

Related Commands

| no | Removes or resets IPv6 settings on this VLAN interface |
7.1.34.3.7 no

Negates a command or reverts to defaults. The no command, when used in the Config Interface VLAN mode, negates VLAN interface settings or reverts them to their default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [crypto|description|dhcp|dhcp-relay-incoming|ip|ipv6|shutdown|use]
no dhcp client include client-identifier
no [crypto map|description|dhcp-relay-incoming|shutdown]
no ip [address|dhcp|helper-address|nat|ospf]
no ip [helper-address <IP>|nat]
no ip address {<IP/M> [secondary]|<NETWORK-ALIAS-NAME> [secondary]|dhcp|zeroconf [secondary]}
no ip dhcp client request options all
no ip ospf [authentication|authentication-key|bandwidth|cost|message-digest-key|priority]
no ipv6 [accept|address|dhcp|enable|enforce-dad|mtu|redirects|request-dhcpv6-options|router-advertisement]
no ipv6 [accept ra|enable|enforce-dad|mtu|redirects|request-dhcpv6-options]
no ipv6 address [{<IPv6/M>|autoconfig|eui-64|link-local|prefix-from-provider}] no ipv6 dhcp [client|relay]
no ipv6 router-advertisement [prefix <WORD>|prefix-from-provider <WORD>]
no use [bonjour-gw-discovery-policy|ip-access-list in|ipv6-access-list in|ipv6-router-advertisement-policy|url-filter]

Parameters

- no <PARAMETERS>

Examples

The following example shows the VLAN interface settings before the 'no' commands are executed:

```
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#show context
interface vlan8
  description "This VLAN interface is configured for the Sales Team"
  ip address 10.0.0.1/8
  ip dhcp client request options all
  ip helper-address 172.16.10.3
  ip nat inside
  crypto map map1
dhcp-relay-incoming
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#
```

```
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#no crypto map
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#no description
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#no dhcp-relay-incoming
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#no ip dhcp client request options all
```
The following example shows the VLAN interface settings after the ‘no’ commands are executed:

```
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#show context
interface vlan8
  ip address 10.0.0.1/8
  ip helper-address 172.16.10.3
  ip nat inside
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#
```
7.1.34.3.8 shutdown

úmero-config-vlan-instance

Shuts down the selected interface. Use the no shutdown command to enable an interface.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

shutdown

Parameters

None

Examples

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#shutdown

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#show context

interface vlan8
  ip address 10.0.0.1/8
  ip helper-address 172.16.10.3
  shutdown

rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables or reverts interface VLAN settings to their default</td>
</tr>
</tbody>
</table>
7.1.34.3.9 use

> interface-config-vlan-instance

Associates an IP (IPv4 and IPv6) access list, bonjour-gw-discovery policy, and an IPv6-router-advertisement policy with this VLAN interface.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9510, NX9600

Syntax

```
use [bonjour-gw-discovery-policy <POLICY-NAME> | ip-access-list in <IP-ACL-NAME> | ipv6-access-list in <IPv6-ACL-NAME> | ipv6-router-advertisement-policy <POLICY-NAME> | url-filter <URL-FILTER-NAME>]
```

Parameters

- `use [bonjour-gw-discovery-policy <POLICY-NAME> | ip-access-list in <IP-ACL-NAME> | ipv6-access-list in <IPv6-ACL-NAME> | ipv6-router-advertisement-policy <POLICY-NAME> | url-filter <URL-FILTER-NAME>]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| `bonjour-gw-discovery-policy <POLICY-NAME>` | Uses an existing Bonjour GW Discovery policy with this VLAN interface. When associated, the Bonjour GW Discovery policy is applied for the Bonjour requests coming over the VLAN interface.  
  • `<POLICY-NAME>` – Specify the Bonjour GW Discovery policy name (should be existing and configured).  
  **Note:** For more information on Bonjour GW Discovery policy, see `bonjour-gw-discovery-policy`. |
| `ip-access-list in <IP-ACCESS-LIST-NAME>` | Uses a specified IPv4 access list with this interface  
  • `in` – Applies IPv4 ACL to incoming packets  
  • `<IP-ACCESS-LIST-NAME>` – Specify the IPv4 access list name. |
| `ipv6-access-list in <IPv6-ACCESS-LIST-NAME>` | Uses a specified IPv6 access list with this interface  
  • `in` – Applies IPv6 ACL to incoming packets  
  • `<IPv6-ACCESS-LIST-NAME>` – Specify the IPv6 access list name. |
| `ipv6-router-advertisement-policy <POLICY-NAME>` | Uses an existing IPv6 router advertisement policy with this VLAN interface.  
  • `<POLICY-NAME>` – Specify the IPv6 router advertisement policy name (should be existing and configured). |
| `url-filter <URL-FILTER-NAME>` | Enforces URL filtering on this VLAN interface by associating a URL filter  
  • `<URL-FILTER-NAME>` – Specify the URL filter name (should be existing and configured). |

Examples

```
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#use ip-access-list in test
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#show context
  interface vlan8
    ip address 10.0.0.1/8
    use ip-access-list in test
      ip helper-address 172.16.10.3
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#
```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables or reverts interface VLAN settings to their default</td>
</tr>
</tbody>
</table>
7.1.34.4 interface-config-radio-instance

This section documents radio interface configuration parameters applicable only to the access point profiles and the RFS4011 profile.

The access point radio interface can be radio1, radio2, or radio3. Legacy AP71XX models contain either a single or a dual radio configuration. Newer AP71XXN model access points support single, dual, or triple radio configurations. An AP650 model access point is available in either single or dual radio models. The remainder of the access point portfolio are dual-radio models.

To enter the AP/RFS4000 profile > radio interface context, use the following commands:

<DEVICE>(config)#profile RFS4000 <RFS4000-PROFILE-NAME>

<DEVICE>(config)#profile <AP-TYPE> <PROFILE-NAME>

rfs7000-37FABE(config)#profile ap71xx 71xxTestProfile
rfs7000-37FABE(config-profile-71xxTestProfile)#

rfs7000-37FABE(config-profile-71xxTestProfile)#interface radio 1
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#?

Radio Mode commands:

- adaptivity
- aeroscout
- aggregation
- airtime-fairness
- antenna-diversity
- antenna-downtilt
- antenna-elevation
- antenna-gain
- antenna-mode
- assoc-response
- association-list
- beacon
- bridge
- channel
- data-rates
- description
- dfs-rehome
- dynamic-chain-selection
- ekahau
- extended-range
- fallback-channel
- guard-interval
- ldpc
- lock-rf-mode
- max-clients
- mesh
- meshpoint
- no
- non-unicast
- off-channel-scan
- placement
The following table summarizes the radio interface configuration commands:

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>adaptivity</td>
<td>Configures an adaptivity timeout value, in minutes, for avoidance of channels detected with radar or high levels of interference</td>
<td>page 7-222</td>
</tr>
<tr>
<td>aeroscout</td>
<td>Enables Aeroscout multicast packet forwarding</td>
<td>page 7-223</td>
</tr>
<tr>
<td>aggregation</td>
<td>Configures 802.11n aggregation parameters</td>
<td>page 7-224</td>
</tr>
<tr>
<td>airtime-fairness</td>
<td>Enables fair access for clients based on airtime usage</td>
<td>page 7-227</td>
</tr>
<tr>
<td>antenna-diversity</td>
<td>Transmits antenna diversity for non-11n transmit rates</td>
<td>page 7-228</td>
</tr>
<tr>
<td>antenna-elevation</td>
<td>Enables Advanced Element Panel Technology (ADEPT) antenna mode</td>
<td>page 7-229</td>
</tr>
<tr>
<td>antenna-gain</td>
<td>Specifies the antenna gain for the selected radio</td>
<td>page 7-232</td>
</tr>
<tr>
<td>antenna-mode</td>
<td>Configures the radio antenna mode</td>
<td>page 7-233</td>
</tr>
</tbody>
</table>
### Table 7.16 Radio Interface Config Mode Commands

<table>
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<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>assoc-response</td>
<td>Enables an access point to ignore or respond to an association/authorization request based on the configured Received Signal Strength Index (RSSI) threshold and deny-threshold values</td>
<td>page 7-234</td>
</tr>
<tr>
<td>association-list</td>
<td>Associates an existing global association list with this radio interface</td>
<td>page 7-235</td>
</tr>
<tr>
<td>beacon</td>
<td>Configures beacon parameters</td>
<td>page 7-236</td>
</tr>
<tr>
<td>bridge</td>
<td>Configures client-bridge related parameters, if the selected radio is functioning as a client bridge. This option is applicable only on radio 2 of the AP6522 and AP6562 model access points.</td>
<td>page 7-238</td>
</tr>
<tr>
<td>channel</td>
<td>Configures a radio’s channel of operation</td>
<td>page 7-248</td>
</tr>
<tr>
<td>data-rates</td>
<td>Specifies the 802.11 rates supported on a radio</td>
<td>page 7-249</td>
</tr>
<tr>
<td>description</td>
<td>Configures the selected radio’s description</td>
<td>page 7-253</td>
</tr>
<tr>
<td>dfs-rehome</td>
<td>Reverts to configured home channel once Dynamic Frequency Selection (DFS) evacuation period expires</td>
<td>page 7-254</td>
</tr>
<tr>
<td>dynamic-chain-selection</td>
<td>Enables automatic antenna mode selection</td>
<td>page 7-255</td>
</tr>
<tr>
<td>ekahau</td>
<td>Enables Ekahau multicast packet forwarding</td>
<td>page 7-256</td>
</tr>
<tr>
<td>extended-range</td>
<td>Configures extended range</td>
<td>page 7-257</td>
</tr>
<tr>
<td>fallback-channel</td>
<td>Configures the channel to which the radio switches in case of radar detection on the current channel</td>
<td>page 7-258</td>
</tr>
<tr>
<td>guard-interval</td>
<td>Configures the 802.11n guard interval</td>
<td>page 7-259</td>
</tr>
<tr>
<td>ldpc</td>
<td>Enables support for Low Density Parity Check (LDPC) on the radio interface</td>
<td>page 7-260</td>
</tr>
<tr>
<td>lock-rf-mode</td>
<td>Retains user configured RF mode settings for the selected radio</td>
<td>page 7-261</td>
</tr>
<tr>
<td>max-clients</td>
<td>Configures the maximum number of wireless clients allowed to associate with this radio</td>
<td>page 7-262</td>
</tr>
<tr>
<td>mesh</td>
<td>Configures radio mesh parameters</td>
<td>page 7-263</td>
</tr>
<tr>
<td>meshpoint</td>
<td>Maps an existing meshpoint to this radio interface</td>
<td>page 7-265</td>
</tr>
<tr>
<td>no</td>
<td>Negates or resets radio interface settings configures on a profile or a device</td>
<td>page 7-266</td>
</tr>
<tr>
<td>non-unicast</td>
<td>Configures the handling of non unicast frames on this radio</td>
<td>page 7-269</td>
</tr>
<tr>
<td>off-channel-scan</td>
<td>Enables selected radio’s off channel scanning parameters</td>
<td>page 7-271</td>
</tr>
<tr>
<td>placement</td>
<td>Defines selected radio’s deployment location</td>
<td>page 7-273</td>
</tr>
<tr>
<td>power</td>
<td>Configures the transmit power on this radio</td>
<td>page 7-274</td>
</tr>
<tr>
<td>preamble-short</td>
<td>Enables the use of short preamble on this radio</td>
<td>page 7-275</td>
</tr>
<tr>
<td>probe-response</td>
<td>Configures transmission parameters for probe response frames</td>
<td>page 7-276</td>
</tr>
</tbody>
</table>
### Radio Interface Config Mode Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>radio-resource-measurement</td>
<td>Enables 802.11k radio resource measurement</td>
<td>page 7-277</td>
</tr>
<tr>
<td>radio-share-mode</td>
<td>Configures the mode of operation, for this radio, as radio-share</td>
<td>page 7-278</td>
</tr>
<tr>
<td>rate-selection</td>
<td>Sets the rate selection method to standard or opportunistic</td>
<td>page 7-279</td>
</tr>
<tr>
<td>rf-mode</td>
<td>Configures the radio’s RF mode</td>
<td>page 7-280</td>
</tr>
<tr>
<td>rifs</td>
<td>Configures Reduced Interframe Spacing (RIFS) parameters on this radio</td>
<td>page 7-282</td>
</tr>
<tr>
<td>rts-threshold</td>
<td>Configures the Request to Send (RTS) threshold value on this radio</td>
<td>page 7-283</td>
</tr>
<tr>
<td>service</td>
<td>Enables dynamic control function. This dynamic function controls performance of the radio receiver’s low noise amplifiers (LNAs).</td>
<td>page 7-284</td>
</tr>
<tr>
<td>shutdown</td>
<td>Terminates or shuts down selected radio interface</td>
<td>page 7-285</td>
</tr>
<tr>
<td>smart-rf</td>
<td>Overrides Smart RF channel width setting on the selected radio interface</td>
<td>page 7-286</td>
</tr>
<tr>
<td>sniffer-redirect</td>
<td>Captures and redirects packets to an IP address running a packet capture/analysis tool</td>
<td>page 7-287</td>
</tr>
<tr>
<td>stbc</td>
<td>Configures radio’s Space Time Block Coding (STBC) mode</td>
<td>page 7-289</td>
</tr>
<tr>
<td>transmit-beamforming</td>
<td>Enables transmit beamforming on the selected radio interface</td>
<td>page 7-290</td>
</tr>
<tr>
<td>use</td>
<td>Enables use of an association ACL policy and a radio QoS policy by selected radio interface</td>
<td>page 7-291</td>
</tr>
<tr>
<td>wips</td>
<td>Enables access point to change its channel of operation in order to terminate rogue devices</td>
<td>page 7-292</td>
</tr>
<tr>
<td>wireless-client</td>
<td>Configures wireless client parameters on selected radio</td>
<td>page 7-293</td>
</tr>
<tr>
<td>wlan</td>
<td>Enables a WLAN on selected radio</td>
<td>page 7-294</td>
</tr>
</tbody>
</table>
### 7.1.34.4.1 adaptivity

#### adaptivity

*interface-config-radio-instance*

Configures an interval, in minutes, for avoiding channels detected with high levels of interference.

As per the *European Telecommunications Standards Institute’s* (ETSI) EN 300 328 V1.8.1/ ETSI EN 301 893 V1.7.1 requirements, access points have to monitor interference levels on operating channels, and stop functioning on channels with interference levels exceeding ETSI-specified threshold values.

This command configures the interval for which a channel is avoided on detection of interference, and is applicable only if the channel selection mode is set to ACS, Random, or Fixed.

---

**NOTE:** If the channel selection mode is set to Smart, in the Smart-RF policy mode, use the `avoidance-time > [adaptivity|dfs] > <30-3600>` command to specify the interval for which a channel is avoided on detection of high levels of interference or radar. For more information, see `avoidance-time`.

---

When configured, this feature ensures recovery by switching the radio to a new operating channel. Once adaptivity is triggered, the evacuated channel becomes inaccessible and is available again only after the adaptivity timeout, specified here, expires. In case of fixed channel, the radio switches back to the original channel of operation after the adaptivity timeout expires. On the other hand, ACS-enabled radios continue operating on the new channel even after the adaptivity timeout period expires.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```
adaptivity [recovery|timeout <30-3600>]
```

**Parameters**

- `adaptivity [recovery|timeout <30-3600>]`

<table>
<thead>
<tr>
<th>adaptivity</th>
<th>Configures adaptivity parameters on the radio. These parameters are: recovery and timeout.</th>
</tr>
</thead>
<tbody>
<tr>
<td>recovery</td>
<td>Enables switching of channels when an access point’s radio is in the adaptivity mode. In the adaptivity mode, an access point monitors interference on its set channel and stops functioning when the radio’s defined interference tolerance level is exceeded. When the defined adaptivity timeout is exceeded, the radio resumes functionality on a different channel. This option is enabled by default.</td>
</tr>
<tr>
<td>timeout &lt;30-3600&gt;</td>
<td>Configures an adaptivity timeout</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;30-3600&gt;</code> – Specify a value from 30 - 3600 minutes. The default is 90 minutes.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx4500-5CFA2B(config-profile-testAP7532-if-radio1)#adaptivity timeout 200

nx4500-5CFA2B(config-profile-testAP7532-if-radio1)#show context interface radio1 adaptivity timeout 200

nx4500-5CFA2B(config-profile-testAP7532-if-radio1)#
```

**Related Commands**

- `no` Removes the configured adaptivity timeout value and disables adaptivity recovery
7.1.34.4.2 aeroscout

Enables Aeroscout multicast packet forwarding. This feature is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**
aeroscout [forward|mac <MAC>]

**Parameters**
- aeroscout [forward|mac <MAC>]

<table>
<thead>
<tr>
<th>aeroscout</th>
<th>Configures aeroscout enabling forwarding parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>forward</td>
<td>Enables Aeroscout multicast packet forwarding to a specified MAC address. When enabled, Aeroscout tags associate with an access point, then communicate with a location engine.</td>
</tr>
<tr>
<td>mac &lt;MAC&gt;</td>
<td>Configures the multicast MAC address to forward the packets</td>
</tr>
<tr>
<td></td>
<td>- &lt;MAC&gt; – Specify the MAC address in the AA-BB-CC-DD-EE-FF format.</td>
</tr>
</tbody>
</table>

**Examples**
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#aeroscout forward
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context interface radio1
   aeroscout forward
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

**Related Commands**
- **no** | Disables Aeroscout Multicast packet forwarding |
### 7.1.34.4.3 aggregation

`interface-config-radio-instance`

Configures 802.11n frame aggregation parameters. Frame aggregation increases throughput by sending two or more data frames in a single transmission. There are two types of frame aggregation: *MAC Service Data Unit* (MSDU) aggregation and *MAC Protocol Data Unit* (MPDU) aggregation. Both modes group several data frames into one large data frame.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```plaintext
aggregation [ampdu|amsdu]
aggregation ampdu [rx-only|tx-only|tx-rx|none] max-aggr-size [min-spacing]
aggregation ampdu [rx-only|tx-only|tx-rx|none]
aggregation ampdu max-aggr-size [rx|tx]
aggregation ampdu max-aggr-size rx [8191|16383|32767|65535]
aggregation ampdu max-aggr-size tx <2000-65535>
aggregation ampdu min-spacing [0|1|2|4|8|16]
aggregation amsdu [rx-only|tx-rx]
```

**Parameters**

- **aggregation ampdu [rx-only|tx-only|tx-rx|none]**
  - **ampdu**
    - Configures *Aggregate MAC Protocol Data Unit* (AMPDU) frame aggregation parameters
    - AMPDU aggregation collects Ethernet frames addressed to a single destination. It wraps each frame in an 802.11n MAC header. This aggregation mode is less efficient, but more reliable in environments with high error rates. It enables the acknowledgement and retransmission of each aggregated data frame individually.
  - **tx-only**
    - Supports the transmission of AMPDU aggregated frames only
  - **rx-only**
    - Supports the receipt of AMPDU aggregated frames only
  - **tx-rx**
    - Supports the transmission and receipt of AMPDU aggregated frames (default setting)
  - **none**
    - Disables support for AMPDU aggregation

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aggregation</td>
<td>Configures 802.11n frame aggregation parameters</td>
</tr>
<tr>
<td>ampdu</td>
<td>Configures <em>Aggregate MAC Protocol Data Unit</em> (AMPDU) frame aggregation parameters</td>
</tr>
<tr>
<td>tx-only</td>
<td>Supports the transmission of AMPDU aggregated frames only</td>
</tr>
<tr>
<td>rx-only</td>
<td>Supports the receipt of AMPDU aggregated frames only</td>
</tr>
<tr>
<td>tx-rx</td>
<td>Supports the transmission and receipt of AMPDU aggregated frames (default setting)</td>
</tr>
<tr>
<td>none</td>
<td>Disables support for AMPDU aggregation</td>
</tr>
</tbody>
</table>

- **aggregation ampdu max-aggr-size rx [8191|16383|32767|65535]**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aggregation</td>
<td>Configures 802.11n frame aggregation parameters</td>
</tr>
<tr>
<td>ampdu</td>
<td>Configures AMPDU frame aggregation parameters</td>
</tr>
<tr>
<td>ampdu</td>
<td>AMPDU aggregation collects Ethernet frames addressed to a single destination. It wraps each frame in an 802.11n MAC header. This aggregation mode is less efficient, but more reliable in environments with high error rates. It enables the acknowledgement and retransmission of each aggregated data frame individually.</td>
</tr>
</tbody>
</table>
### max-aggr-size

Configures AMPDU packet size limits. Configure the packet size limit on packets both transmitted and received.

### rx

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[8191</td>
<td>16383</td>
</tr>
<tr>
<td>8191</td>
<td>Advertises a maximum of 8191 bytes</td>
</tr>
<tr>
<td>16383</td>
<td>Advertises a maximum of 16383 bytes</td>
</tr>
<tr>
<td>32767</td>
<td>Advertises a maximum of 32767 bytes</td>
</tr>
<tr>
<td>65535</td>
<td>Advertises a maximum of 65535 bytes (default setting)</td>
</tr>
</tbody>
</table>

### aggregation ampdu max-aggr-size tx <2000-65535>

### aggregation

Configures 802.11n frame aggregation parameters

### ampdu

Configures AMPDU frame aggregation parameters

AMPDU aggregation collects Ethernet frames addressed to a single destination. It wraps each frame in an 802.11n MAC header. This aggregation mode is less efficient, but more reliable in environments with high error rates. It enables the acknowledgement and retransmission of each aggregated data frame individually.

### max-aggr-size

Configures AMPDU packet size limits. Configure the packet size limit on packets both transmitted and received.

### tx <2000-65535>

Configures the maximum size (in bytes) for AMPDU aggregated transmitted frames

- <2000-65535> – Sets the limit from 2000 - 65535 bytes. The default is 65535 bytes.

### aggregation ampdu min-spacing [0|1|2|4|8|16|auto]

### aggregation

Configures 802.11n frame aggregation parameters

### amsdu

Configures Aggregated MAC Service Data Unit (AMSDU) frame aggregation parameters. AMSDU aggregation collects Ethernet frames addressed to a single destination. But, unlike AMPDU, it wraps all frames in a single 802.11n frame.

### rx-only

Supports the receipt of AMSDU aggregated frames only (default setting)

### tx-rx

Supports the transmission and receipt of AMSDU aggregated frames
Examples

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#aggregation ampdu tx-only

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  aggregation ampdu tx-only
  aeroscout forward
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands

| no | Disables 802.11n aggregation parameters |
7.1.34.4 airtime-fairness

`interface-config-radio-instance`

Enables fair access to the medium for wireless clients based on their airtime usage (i.e. regardless of whether the client is a high-throughput (802.11n) or legacy client). This option is enabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```
airtime-fairness {prefer-ht} {weight <1-10>}
```

**Parameters**

- `airtime-fairness {prefer-ht} {weight <1-10>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>airtime-fairness</td>
<td>Enables fair access to the medium for wireless clients based on their airtime usage</td>
</tr>
<tr>
<td>prefer-ht</td>
<td>Optional. Prioritizes high throughput (802.11n) clients over clients with slower throughput (802.11 a/b/g) and legacy clients</td>
</tr>
<tr>
<td>weight &lt;1-10&gt;</td>
<td>Optional. Configures the relative weightage for 11n clients over legacy clients.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;1-10&gt;</code> – Sets a weightage ratio for 11n clients from 1 - 10</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#airtime-fairness prefer-ht weight 6
```

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  aggregation ampdu tx-only
  aeroscout forward
  airtime-fairness prefer-ht weight 6
```

**Related Commands**

`no` Disables fair access for wireless clients (provides access on a round-robin mode)
7.1.34.4.5 antenna-diversity

`interface-config-radio-instance`

Configures transmit antenna diversity for non-11n transmit rates

Antenna diversity uses two or more antennas to increase signal quality and strength. This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

`antenna-diversity`

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#antenna-diversity
```

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  aggregation ampdu tx-only
  aeroscout forward
  `antenna-diversity`
  airtime-fairness prefer-ht weight 6
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Uses single antenna for non-11n transmit rates</td>
</tr>
</tbody>
</table>
7.1.34.4.6 antenna-downtilt

Enables the Advanced Element Panel Technology (ADEPT) antenna mode. The ADEPT mode increases the probability of parallel data paths enabling multiple spatial data streams. This option is disabled by default.

Supported in the following platforms:
- Access Point — AP7161, AP7181

Syntax
antenna-downtilt

Parameters
None

Examples
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#antenna-downtilt
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
  interface radio1
    antenna-gain 12.0
    aggregation ampdu tx-only
    aeroscout forward
    antenna-diversity
    airtime-fairness prefer-ht weight 6
    antenna-downtilt

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the ADEPT antenna mode</td>
</tr>
</tbody>
</table>

NOTE: This feature is not supported on AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, and RFS4011.
7.1.34.4.7 antenna-elevation

`interface-config-radio-instance`

Configures an antenna's elevation gain. Antenna gain is the ratio of an antenna's radiation intensity in a given direction to the intensity produced by a no-loss, isotropic antenna radiating equally in all directions. An antenna's gain along the horizon and at an elevation of 30 degree may vary. The elevation gain is defined as the maximum antenna gain at 30 to 150 degrees above the horizon. If elevation gain is configured, the transmit (TX) power calculations maximize the allowable TX power for an elevation below 30 degree.

Access Points must conform to U.S. Federal Communications Commission's (FCC) limitations. FCC has now stipulated a 21dBm Effective Isotropic Radiated Power (EIRP) limit for power directed 30 degrees above the horizon.

For Zebra-supplied antennas, compatible with 5.0 GHz on the AP7562 access point, refer to the Antenna Guide for "Elevation Gain" information. If using a third-party antenna, it is required that you obtain the antenna-elevation gain information from the antenna manufacturer.

The elevation gain should be configured if the access point:

- Is deployed outdoors, and
- Is used with a dipole antenna (panel antenna and polarized antenna are for point to point only, and are excluded from this requirement), and
- Is transmitting in the 5.15 - 5.25 GHz Unlicensed National Information Infrastructure-1 (UNII-1) band.

Professional Installers must complete the following steps to ensure compliance with the FCC rule:

1. Configure the antenna type. For example:
   ```
   ap7562-80C2AC(config-device-84-24-8D-80-C2-AC-if-radio2)#service antenna-type dipole
   ```

2. Configure the antenna peak gain. For example:
   ```
   ap7562-80C2AC(config-device-84-24-8D-80-C2-AC-if-radio2)#antenna-gain 7.0
   ```

3. Configure the antenna placement. For example:
   ```
   ap7562-80C2AC(config-device-84-24-8D-80-C2-AC-if-radio2)#placement outdoor
   ```

4. Configure the antenna elevation gain. For example:
   ```
   ap7562-80C2AC(config-device-84-24-8D-80-C2-AC-if-radio2)#antenna-elevation 5.0
   ```

After the professional installer enters the antenna type, gain, placement, and elevation gain using the CLI as outlined above, the firmware will use this information and hardcoded maximum limits determined during testing (See Annex C in FCC Report #FR4D0448AB) to limit the EIRP below 21dBm for outdoor use in UNII-1 band. The antenna information is provided in the Installation guide and antenna guide.

Supported in the following platforms:

- Access Points — AP7562

**Syntax**

```
antenna-elevation <-30.0-36.0>
```

---

**NOTE:** The antenna elevation gain feature is supported only on the AP7562 model access point.

**Parameters**

- **antenna-elevation <-30.0-36.0>**

| **antenna-elevation <-30.0-36.0>** | Configures the antenna elevation gain from -30.0 - 36.0 dB. Refer to the antenna specifications for antenna-elevation gain information. The default value is 0 dB. |
Examples

```
ap7562-80C2AC(config-device-84-24-8D-80-C2-AC-if-radio2)#antenna-elevation 5.0
ap7562-80C2AC(config-device-84-24-8D-80-C2-AC-if-radio2)#show context interface radio2
  antenna-elevation 5.0
ap7562-80C2AC(config-device-84-24-8D-80-C2-AC-if-radio2)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets antenna elevation gain to default (0 dB)</td>
</tr>
</tbody>
</table>
### 7.1.34.4.8 antenna-gain

Configures the antenna gain for the selected radio

Antenna gain is the ability of an antenna to convert power into radio waves and vice versa. The access point or wireless controller's *Power Management Antenna Configuration File* (PMACF) automatically configures the access point or wireless controller's radio transmit power based on the antenna type, its antenna gain (provided here) and the deployed country's regulatory domain restrictions. Once provided, the access point or wireless controller calculates the power range. Antenna gain relates the intensity of an antenna in a given direction to the intensity that would be produced ideally by an antenna that radiates equally in all directions (isotropically), and has no losses. Although the gain of an antenna is directly related to its directivity, its gain is a measure that takes into account the efficiency of the antenna as well as its directional capabilities. It is recommended that only a professional installer set the antenna gain.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**
```
antenna-gain <0.0-15.0>
```

**Parameters**

- `antenna-gain <0.0-15.0>`

<table>
<thead>
<tr>
<th>antenna-gain &lt;0.0-15.0&gt;</th>
<th>Sets the antenna gain from 0.0 - 15.0 dBi. The default is 0.00 dBi.</th>
</tr>
</thead>
</table>

**Examples**
```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#antenna-gain 12.0

total: 0

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context

interface radio1
  antenna-gain 12.0
  aggregation ampdu tx-only
  aeroscout forward
  antenna-diversity
  airtime-fairness prefer-ht weight 6
  antenna-downtilt
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**
```
no
```
Resets the radio's antenna gain parameter
7.1.34.4.9 antenna-mode

Configures the antenna mode (the number of transmit and receive antennas) on the access point.

This command sets the number of transmit and receive antennas on the access point. The 1x1 mode is used for transmissions over just the single -A- antenna, 1xALL is used for transmissions over the -A- antenna and all three antennas for receiving. The 2x2 mode is used for transmissions and receipts over two antennas for dual antenna models. 3x3x3 is used for transmissions and receipts over three antennas for AP81XX models. The default setting is dynamic based on the access point model deployed and its transmit power settings.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax
antenna-mode [1*1|1*ALL|2*2|3*3|default]

Parameters
- antenna-mode [1*1|1*ALL|2*2|default]

<table>
<thead>
<tr>
<th>antenna-mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*1</td>
<td>Uses only antenna A to receive and transmit</td>
</tr>
<tr>
<td>1*ALL</td>
<td>Uses antenna A to transmit and receives on all antennas</td>
</tr>
<tr>
<td>2*2</td>
<td>Uses antennas A and C for both transmit and receive</td>
</tr>
<tr>
<td>3*3</td>
<td>Uses antenna A, B, and C for both transmit and receive</td>
</tr>
<tr>
<td>default</td>
<td>Uses default antenna settings. This is the default setting.</td>
</tr>
</tbody>
</table>

Usage Guidelines
To support STBC feature on AP71XX profile, the antenna-mode should not be configured to 1*1.

Examples
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#antenna-mode 2x2
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context interface radio1
  antenna-gain 12.0
  aggregation ampdu tx-only
  aeroscout forward
  antenna-mode 2x2
  antenna-diversity
  airtime-fairness prefer-ht weight 6
  antenna-downtilt
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands
- no
  Resets the radio antenna mode (the number of transmit and receive antennas) to its default
7.1.34.4.10 assoc-response

`interface-config-radio-instance`

Configures the parameters determining whether the access point ignores or responds to an association/authorization request

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

```
assoc-response [deny-threshold <1-12>|rssi-threshold <-128--40>]
```

Parameters

- `assoc-response [deny-threshold <1-12]|rssi-threshold <-128--40>]`

<table>
<thead>
<tr>
<th>assoc-response</th>
<th>Configures the following thresholds, based on which the AP ignores or responds to an association/authorization request: deny-threshold and rssi-threshold. Both these options are disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny-threshold</td>
<td>Configures the number of times the AP ignores association/authorization requests, if the RSSI is below the configured RSSI threshold value.</td>
</tr>
<tr>
<td>&lt;1-12&gt;</td>
<td>• &lt;1-12&gt; – Specify a value from 1 - 12.</td>
</tr>
<tr>
<td>Note:</td>
<td>The AP always ignores association/authorization requests when deny-threshold is not specified and rssi-threshold is specified.</td>
</tr>
<tr>
<td>rssi-threshold</td>
<td>Configures the RSSI threshold. If the RSSI is lower than the threshold configured here, the AP ignores the association/authorization request.</td>
</tr>
<tr>
<td>&lt;-128--40&gt;</td>
<td>• &lt;-128--40&gt; – Specify the RSSI threshold from -128 - -40 dBi.</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-profile-71XXTestProfile-if-radio1)#assoc-response rssi-threshold -128
rfs7000-37FABE(config-profile-71XXTestProfile-if-radio1)#show context interface radio1
assoc-response rssi-threshold -128
rfs7000-37FABE(config-profile-71XXTestProfile-if-radio1)#
```

Related Commands

- `no` Removes the RSSI threshold, based on which an association/authorization request is either ignored or responded.
### 7.134.11 association-list

`interface-config-radio-instance`

Associates an existing global association list with this radio interface

An association ACL is a policy-based access control list (ACL) that either prevents or allows wireless clients from connecting to a managed access point radio. An ACL is a sequential collection of permit and deny rules that apply to incoming and outgoing packets. When a packet is received on an interface, the controller, service platform, or access point compares the fields in the packet against the applied ACLs to verify the packet has the required permissions to be forwarded. If a packet does not meet any of the criteria specified in the ACL, it is dropped.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```plaintext
association-list global <GLOBAL-ASSOC-LIST-NAME>
```

**Parameters**

- `association-list global <GLOBAL-ASSOC-LIST-NAME>`

**Examples**

```plaintext
rfs4000-880DA7(config-profile-test-if-radio1)#association-list global test
rfs4000-880DA7(config-profile-test-if-radio1)#show context interface radio1
        association-list global test
rfs4000-880DA7(config-profile-test-if-radio1)#ab
```

**Related Commands**

- `no` Removes the global association list associated with this radio interface
### 7.1.34.4.12 beacon

**interface-config-radio-instance**

Configures radio beacon parameters

A beacon is a packet broadcasted by adopted radios to keep the network synchronized. Included in a beacon is information, such as the WLAN service area, the radio address, the broadcast destination addresses, a time stamp, and indicators about traffic and delivery such as a *Delivery Traffic Indication Message* (DTIM). Increase the DTIM/beacon settings (lengthening the time) to let nodes sleep longer and preserve battery life. Decrease these settings (shortening the time) to support streaming-multicast audio and video applications that are jitter sensitive.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```
beacon [dtim-period|period]
beacon dtim-period [<1-50>|bss]
beacon dtim-period [<1-50>|bss <1-16> <1-50>]
beacon period [50|100|200]
```

**Parameters**

- **beacon dtim-period [<1-50>|bss <1-16> <1-50>]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>beacon</td>
<td>Configures radio beacon parameters</td>
</tr>
<tr>
<td>dtim-period</td>
<td>Configures the radio DTIM interval. A DTIM is a message that informs wireless clients about the presence of buffered multicast or broadcast data. These are simple data frames that require no acknowledgement, so nodes sometimes miss them. Increase the DTIM/ beacon settings (lengthening the time) to let nodes sleep longer and preserve their battery life. Decrease these settings (shortening the time) to support streaming multicast audio and video applications that are jitter sensitive.</td>
</tr>
<tr>
<td>&lt;1-50&gt;</td>
<td>Configures a single value to use on the radio. Specify a value between 1 and 50.</td>
</tr>
<tr>
<td>bss &lt;1-16&gt; &lt;1-50&gt;</td>
<td>Configures a separate DTIM for a Basic Service Set (BSS) on this radio interface</td>
</tr>
<tr>
<td>period [50</td>
<td>100</td>
</tr>
<tr>
<td>50</td>
<td>Configures 50 K-uSec interval between beacons</td>
</tr>
<tr>
<td>100</td>
<td>Configures 100 K-uSec interval between beacons (default)</td>
</tr>
<tr>
<td>200</td>
<td>Configures 200 K-uSec interval between beacons</td>
</tr>
</tbody>
</table>
Examples
rfs7000-37FABE(config-profile-71xxTestProfile-if-radiol)#beacon dtim-period bss 2 20
rfs7000-37FABE(config-profile-71xxTestProfile-if-radiol)#beacon period 50
rfs7000-37FABE(config-profile-71xxTestProfile-if-radiol)#show context
interface radio1
  beacon period 50
  beacon dtim-period bss 1 2
  beacon dtim-period bss 2 20
  beacon dtim-period bss 3 2
  --More--

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the configured beacon parameters</td>
</tr>
</tbody>
</table>
# 7.1.34.4.13 bridge

*interface-config-radio-instance*

Configures client-bridge related parameters if the selected radio is functioning as a client bridge.

**NOTE:** The client-bridge functionality is supported only on interface radio 2 of AP6522 and AP6562 model access points.

Supported in the following platforms:
- Access Points — AP6522, AP6562

## Syntax

```
```

## Parameters


- **bridge** Configures client-bridge related parameters. Use this command to configure client-bridge parameters on the radio interface that has been configured to function as a bridge. To enable client-bridge functionality, on the AP’s radio interface, set the rf-mode to bridge.  
  **Note:** When enabled as a client bridge, the radio by default maps bridged traffic to VLAN 1.

- **authentication-type [eap|none]** Configures the authentication type for the WLAN to which the radio 2 connects. The options are:  
  - eap – Uses EAP authentication (802.1X). If using EAP, use the ‘eap’ keyword to configure EAP related parameters.
  - none – Uses no authentication. This is the default setting.

- **channel-dwell-time <50-2000>** Configures the time, in microseconds, the radio dwells on each channel when the bridge scans for an AP to connect to.  
  - <50-2000> – Specify a value from 50 - 2000 microseconds. The default is 150 microseconds.

- **channel-list [2.4GHz|5GHz] <LIST>** Configures the list of 2.4 GHz and 5.0 GHz channels the radio scans to identify an AP to connect to.  
  - 2.4GHz <LIST> – Configures the 2.4 GHz channel list
  - 5GHz <LIST> – Configures the 5.0 GHz channel list
    - <LIST> – Provide the list of channels separated by commas.  
  **Note:** By default the radio scans all permitted 2.4 GHz and 5.0 GHz channels. To prevent the scanning of a particular band, execute the `bridge > channel-list 2.4 GHz` or `bridge > channel-list 5.0 GHz` command with no channel list assigned in the profile.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>connect-through-bridges</td>
<td>Enables the inclusion of APs (having a bridge radio), when scanning for APs to connect to. When enabled, allows daisy-chaining bridges. This option is disabled by default.</td>
</tr>
</tbody>
</table>
| eap [password [0|2]<PASSWORD>]] [type [peap-mschapv2|tls]] [username <USERNAME>] | Configures EAP authentication parameters  
  - password [0|2]<PASSWORD>]] – Configures the EAP password. The password type depends on the EAP authentication type configured.  
  - PEAP-MSCHAPv2 - PEAP password (for example, zebra)  
  - TLS – PKCS #12 certificate secret  
  Use of EAP-TLS authentication is recommended since it is stronger than PEAP-MSCHAPv2.  
  For more information on EAP TLS authentication and client-side certificates, see EAP Authentication.  
  Use one of the following options to configure the password:  
  - 0 – Configures a clear text password. Enter the password.  
  - 2 – Configures an encrypted password. Enter the password.  
  - <PASSWORD> – Enter the password.  
  - type [peap-mschapv2|tls] – Configures the EAP authentication type. The options are:  
  - PEAP-MSCHAPv2 – Configures the EAP authentication type as PEAP-MSCHAPv2. This is the default setting.  
  - TLS – Configures the EAP authentication type as TLS  
  - username <USERNAME> – Configures the EAP username. The password type depends on the EAP authentication type configured.  
  - PEAP-MSCHAPv2 – PEAP username (example client-bridge)  
  - TLS – Username in the CN field of the installed PKCS #12 client certificate (example client-bridge@example.com)  
  - <USERNAME> – Specify the EAP username |
| encryption-type [ccmp|none|tkip] | Configures the encryption type for the WLAN to which the radio 2 connects. The options are:  
  - ccmp – Uses WPA/WPA2 CCMP encryption  
  - none – Uses no encryption method. This is the default setting.  
  - tkip – Uses WPA/WPA2 TKIP encryption  
  **Note:** As per the 802.11n amendment, 802.11n data-rates can be achieved only if the encryption-type is set to CCMP or none. |
| inactivity-timeout <0-864000> | Configures the inactivity timeout in seconds. If a frame is not received from a wired/wireless client for this amount of time specified here, the client is deleted.  
  - <0-864000> – Specify a value from 0 - 864000 seconds. The default is 600 seconds. |
| keepalive [frame-type [null-data|wnmp]] [interval <0-36000>] | Configures the keep-alive frame type and interval  
  - frame-type – Configures the keep-alive frame type sent on behalf of the bridged client. The options are:  
  - null-data – Transmits 802.11 NULL data frames. This is the default setting  
  - wnmp – Transmits Wireless Network Management Protocol (WNMP) multicast packet  
  - interval <0-36000> – Configures the interval, in seconds, between two successive keep-alive frame transmission.  
  - <0-36000> – Specify a value from 0 - 36000 seconds. The default is 300 seconds. |
| max-clients <1-14> | Configures the maximum number of clients bridged by the access point  
  - <1-14> – Specify a value from 1 - 14. The default is 14. |
Usage Guidelines EAP Authentication

The AP6522/AP6562 client bridges, using EAP-TLS for WLAN authentication, require client-side X.509 certificates to be deployed and installed on them. These certificates contain the PKCS #12 personal information exchange syntax standards that define a file format used to store private keys with accompanying public key certificates, which are protected using a password-based symmetric key.

The PKCS #12 certificate must be installed prior to enabling EAP-TLS on the client bridge radio. The certificate can be transferred to an AP6522/AP6562 client bridge either manually (using FTP, SFTP, or TFTP), or as part of the staging process via MiNT. If the client bridges are already associated and authenticated to the infrastructure WLAN, use PSK or PEAP-MSCHAPv2 to transfer the PKCS #12 certificate.

The following points should be taken into consideration when deploying PKCS #12 client-side certificates:

1. The exported PKCS #12 certificate must include the Private Key. When exporting the PKCS #12 certificate from Microsoft Certificate Services the option Allow private key to be exported must be selected.
2. The EAP username must be defined in the CN field in the subject of the X.509 certificate using the anonymous format.
3. The username in the CN field of the X.509 client-side certificate should match the username defined under radio 2 using the bridge > EAP > username command. For example if the username in the CN field is set to client-bridge@tmelabs.local, the EAP username should also be set to client-bridge@tmelabs.local.
4. The password used to secure the PKCS #12 certificate during export must be defined under radio 2 using bridge > EAP > password command. The bridge EAP password value must match the export password for the AP6522/AP6562 client bridge to access the PKCS #12 file.
In a managed WLAN, multiple client-bridges can either use a common X.509 client-side certificate, or individual, unique certificates for each client bridge. If using unique certificates, upload individual PKCS #12 certificate on each AP6522/AP6562 access point. Additionally, if the individual X.509 certificates have unique CN fields or passwords, define a unique bridge EAP username and bridge EAP password parameters as device overrides.

The PEAP-MSCHAPv2 authentication, on the other hand, uses usernames and passwords for RADIUS authentication. These usernames and passwords can be either common or unique to every client-bridge. If using unique credentials, ensure that the AP6522/AP6562 client bridge’s unique username and password are defined in the back-end user directory. Also apply device overrides to each AP6522/AP6562 AP by specifying unique bridge EAP username and bridge EAP password.

Deploying unique credentials or X.509 client-side certificates is recommended, because it is easy to revoke a single user account or X.509 certificate in case an individual client bridge is stolen or compromised. In addition, unique usernames simplify identification of client-bridges within the infrastructure WLAN.

The AP6522/AP6562 access points can be deployed as standalone or centrally-managed client bridges. For steps to configuring client bridges, see Configuring Standalone Client Bridges AND Configuring Centrally Managed Client Bridges.

Examples

```
nx4500-5CFA8E(config-profile-testAP6562-if-radio2)#rf-mode bridge
nx4500-5CFA8E(config-profile-testAP6562-if-radio2)#bridge ssid techPubs
nx4500-5CFA8E(config-profile-testAP6562-if-radio2)#bridge authentication-type eap
nx4500-5CFA8E(config-profile-testAP6562-if-radio2)#bridge eap type tls
nx4500-5CFA8E(config-profile-testAP6562-if-radio2)#bridge eap password 0 testuser@123
nx4500-5CFA8E(config-profile-testAP6562-if-radio2)#bridge eap username testuser
nx4500-5CFA8E(config-profile-testAP6562-if-radio2)#bridge encryption-type ccmp
nx4500-5CFA8E(config-profile-testAP6562-if-radio2)#bridge on-link-loss shutdown-other-radio 500
nx4500-5CFA8E(config-profile-testAP6562-if-radio2)#show context
   interface radio2
      rf-mode bridge
      bridge ssid techPubs
      bridge encryption-type ccmp
      bridge authentication-type eap
      bridge eap-type tls
      bridge eap username testuser@tmelabs.local
      bridge eap password 2 CsWe3artrpr47iFGl2URexAAAAwL3E8VTWvqE6i7CcVDu1
      bridge on-link-loss shutdown-other-radio 500
nx4500-5CFA8E(config-profile-testAP6562-if-radio2)#
```

Examples Configuring Standalone Client Bridges

Following are the recommended best practices for deploying standalone client bridges. These configurations are made on the access point.

Modify the default firewall policy.

1. Access the default firewall config context.

```
AP6522-E91438(config)#firewall-policy default
```

2. Disable DoS detection.

```
AP6522-E91438(config-fw-policy-default)#no ip dos
```

3. Disable IP MAC conflict detection.

```
AP6522-E91438(config-fw-policy-default)#no ip-mac routing conflict
```

4. Disable stateful packet inspection.

```
AP6522-E91438(config-fw-policy-default)#no stateful-packet-inspection-12
```
5. Disable layer 3 firewall.
   AP6522-E91438(config-fw-policy-default)#no firewall enable

6. Exit the default firewall config context and commit and write changes to memory.
   AP6522-E91438(config-fw-policy-default)#exit
   AP6522-E91438(config-fw-policy-default)#commit write

Modify the default management policy.
1. Access the default management policy config context.
   AP6522-E91438(config)#management-policy default

2. Disable management services that are not required.
   AP6522-E91438(config-management-policy-default)#no https server
   AP6522-E91438(config-management-policy-default)#no snmp-server manager all

3. Restrict remote access to specific host(s) or subnet(s).
   AP6522-E91438(config-management-policy-default)#restrict-access subnet 192.168.10.0/24

4. Exit the default management policy config context and commit and write changes to memory.
   AP6522-E91438(config-management-policy-default)#exit
   AP6522-E91438(config)#commit write

Modify the default RF Domain policy.
1. Access the default RF Domain config context.
   AP6522-E91438(config)#rf-domain default

2. Define location, contact, country code, and timezone.
   AP6522-E91438(config-rf-domain-default)#location "Johnson City TN"
   AP6522-E91438(config-rf-domain-default)#contact "kmmarshall@Zebrasolutions.com"
   AP6522-E91438(config-rf-domain-default)#country-code us
   AP6522-E91438(config-rf-domain-default)#timezone EST5EDT

3. Exit the default RF Domain config context and commit and write changes to memory.
   AP6522-E91438(config-rf-domain-default)#exit
   AP6522-E91438(config)#commit write

Modify the default AP6522 profile.
1. Access the default AP6522 profile config context.
   AP6522-E91438(config)#profile AP6522 default-AP6522

2. Modify level 1 MiNT area ID (any value other than 1).
   AP6522-E91438(config-profile-default-AP6522)#mint level 1 area-id 65535

3. Assign DNS name server, Domain name, and NTP server.
   AP6522-E91438(config-profile-default-AP6522)#ip name-server 192.168.10.6
   AP6522-E91438(config-profile-default-AP6522)#tmelabs.local
   AP6522-E91438(config-profile-default-AP6522)#ntp server 192.168.10.1

   AP6522-E91438(config-profile-default-AP6522)#interface radio 1
   AP6522-E91438(config-profile-default-AP6522-if-radio1)#shutdown
   AP6522-E91438(config-profile-default-AP6522-if-radio1)#exit

5. Configure radio 2 as client bridge radio (example for pre-shared key).
   AP6522-E91438(config-profile-default-AP6522)#interface radio 2
   AP6522-E91438(config-profile-default-AP6522-if-radio2)#rf-mode bridge
   AP6522-E91438(config-profile-default-AP6522-if-radio2)#bridge ssid TMELABS-PSK
   AP6522-E91438(config-profile-default-AP6522-if-radio2)#bridge authentication-type none
AP6522-E91438 (config-profile-default-AP6522-if-radio2)#bridge encryption-type ccmp
AP6522-E91438(config-profile-default-AP6522-if-radio2)#bridge wpa-wpa2 psk zebra12345
AP6522-E91438 (config-profile-default-AP6522-if-radio2)#exit

6. Configure radio 2 as client bridge radio (example for PEAP-Mschapv2).

AP6522-E91438 (config-profile-default-AP6522)#interface radio 2
AP6522-E91438 (config-profile-default-AP6522-if-radio2)#rf-mode bridge
AP6522-E91438 (config-profile-default-AP6522-if-radio2)#bridge ssid TMELABS-DOT1X
AP6522-E91438 (config-profile-default-AP6522-if-radio2)#bridge authentication-type eap
AP6522-E91438 (config-profile-default-AP6522-if-radio2)#bridge encryption-type ccmp
AP6522-E91438 (config-profile-default-AP6522-if-radio2)#bridge eap type tls
AP6522-E91438 (config-profile-default-AP6522-if-radio2)#bridge eap username cb@tmelabs.local
AP6522-E91438 (config-profile-default-AP6522-if-radio2)#bridge eap password zebra
AP6522-E91438 (config-profile-default-AP6522-if-radio2)#exit

7. Exit the default AP6522 profile config context and commit and write changes to memory.

AP6522-E91438 (config-profile-default-AP6522)#exit
AP6522-E91438 (config)# commit write

Apply AP6522 device overrides.

1. Access AP6522's device config context.

AP6522-E91438 (config)#AP6522 B4-C7-99-E9-14-38

2. Configure access point's hostname.

AP6522-E91438 (config-device-B4-C7-99-E9-14-38)#hostname AP6522-CB1

3. Exit the AP6522's device config context and commit and write changes to memory.

Configure static IPv4 address and default gateway on the AP6522 client bridge.

1. Access AP6522’s device config context.

AP6522-CB1(config)#AP6522 B4-C7-99-E9-14-38

2. Define a Switched Virtual Interface (SVI) for VLAN 1 for Management.

AP6522-CB1(config-device-B4-C7-99-E9-14-38)#interface vlan 1

3. Define a IPv4 address and mask.

AP6522-CB1(config-device-B4-C7-99-E9-14-38-if-vlan1)#ip address 192.168.13.100/24
AP6522-CB1(config-device-B4-C7-99-E9-14-38-if-vlan1)#exit

4. Define a default gateway.

AP6522-CB1(config-device-B4-C7-99-E9-14-38)#ip default-gateway 192.168.13.1

5. Exit the AP6522’s device config context and commit and write changes to memory.

AP6522-CB1(config-device-B4-C7-99-E9-14-38)#exit
AP6522-CB1(config)#commit write

Define encryption password and enable inline password encryption.

1. Define encryption password.

AP6522-CB1(config)#password-encryption secret 2 zebra

2. Enable inline password encryption.

AP6522-CB1(config)#inline-password-encryption

3. Commit and write changes to memory.

AP6522-CB1(config)#commit write

Pre-stage AP6522 client bridge prior to deployment.
1. Pre-stage the AP6522 client bridge by applying all parameters required to connect to the infrastructure WLAN and manage the device.

   AP6522-CB1(config-device-B4-C7-99-E9-14-38)#use profile default-AP6522
   AP6522-CB1(config-device-B4-C7-99-E9-14-38)#use rf-domain default

Configuring Centrally Managed Client Bridges

Following are the recommended best practices for deploying centrally-managed client bridges. These configurations are made on the staging controller and applied to the client bridge AP on adoption.

Modify the default firewall policy.
1. Access the default firewall config context.

   CBMGR-ACTIVE(config)#firewall-policy default

2. Disable DoS detection.

   CBMGR-ACTIVE(config-fw-policy-default)#no ip dos

3. Disable IP MAC conflict detection.

   CBMGR-ACTIVE(config-fw-policy-default)#no ip-mac routing conflict

4. Disable layer 2 stateful packet inspection.

   CBMGR-ACTIVE(config-fw-policy-default)#no stateful-packet-inspection-l2

5. Disable layer 3 firewall.

   CBMGR-ACTIVE(config-fw-policy-default)#no firewall enable

6. Exit the default firewall config context and commit and write changes to memory.

Create a user-defined management policy.
1. Create a new management policy and enter its config context.

   CBMGR-ACTIVE(config)#management-policy CLIENT-BRIDGES

2. Define an admin user and assign a password to this user.

   CBMGR-ACTIVE(config-management-policy-CLIENT-BRIDGES)#user admin password zebra role superuser access all

3. Disable management services that are not required.

   CBMGR-ACTIVE(config-management-policy-CLIENT-BRIDGES)#no http server
   CBMGR-ACTIVE(config-management-policy-CLIENT-BRIDGES)#no snmp-server manager all

4. Enable SSH.

   CBMGR-ACTIVE(config-management-policy-CLIENT-BRIDGES)#ssh

5. Restrict remote access to specific host(s) or subnet(s).

   CBMGR-ACTIVE(config-management-policy-CLIENT-BRIDGES)#restrict-access subnet 192.168.10.0/24

6. Exit the CLIENT-BRIDGES management policy config context and commit and write changes to memory.

   CBMGR-ACTIVE(config-management-policy-CLIENT-BRIDGES)#exit
   CBMGR-ACTIVE(config)#commit write

Create a user-defined RF Domain.
1. Create a new RF Domain and enter its config context.

   CBMGR-ACTIVE(config)#rf-domain STORE201

2. Define location, contact, country code, and timezone.

   CBMGR-ACTIVE(config-rf-domain-STORE201)#location "Johnson City TN"
   CBMGR-ACTIVE(config-rf-domain-STORE201)#contact "kmarshall@Zebrasolutions.com"
   CBMGR-ACTIVE(config-rf-domain-STORE201)#country-code us
   CBMGR-ACTIVE(config-rf-domain-STORE201)#timezone EST5EDT
3. Exit the STORE201 RF Domain config context and commit and write changes to memory.
   
   CBMGR-ACTIVE(config-rf-domain-STORE201)#exit
   CBMGR-ACTIVE(config)#commit write

**Create a user-defined client-bridge AP6522 profile.**

1. Create a new AP6522 profile and enter its config context.
   
   CBMGR-ACTIVE(config)#profile AP6522 CB-AP6522

2. Modify level 1 MiNT area ID (any value other than 1).
   
   CBMGR-ACTIVE(config-profile-CB-AP6522)#mint level 1 area-id 65535

3. Assign DNS name server, Domain name, and NTP server.
   
   CBMGR-ACTIVE(config-profile-CB-AP6522)#ip name-server 192.168.10.6
   CBMGR-ACTIVE(config-profile-CB-AP6522)#tmelabs.local
   CBMGR-ACTIVE(config-profile-CB-AP6522)#ntp server 192.168.10.1

4. Map the user-defined management policy ‘CLIENT-BRIDGES’ to this AP6522 profile.
   
   CBMGR-ACTIVE(config-profile-CB-AP6522)#use management-policy CLIENT-BRIDGES

5. Define a SVI for VLAN 1 with DHCP enabled for Management & Adoption.
   
   CBMGR-ACTIVE(config-profile-CB-AP6522)#interface vlan 1
   CBMGR-ACTIVE(config-profile-CB-AP6522-if-vlan1)#ip address dhcp
   CBMGR-ACTIVE(config-profile-CB-AP6522-if-vlan1)#ip dhcp client request options all
   CBMGR-ACTIVE(config-profile-CB-AP6522-if-vlan1)#exit

   
   CBMGR-ACTIVE(config-profile-CB-AP6522)#interface radio 1
   CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio1)#shutdown
   CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio1)#exit

7. Configure radio 2 as client bridge radio.
   
   a. Radio 2 as client bridge radio: example for **pre-shared key**
      
      CBMGR-ACTIVE(config-profile-CB-AP6522)#interface radio 2
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#rf-mode bridge
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge ssid TMELABS-PSK
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge authentication-type none
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge encryption-type ccmp
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge wpa-wpa2 psk zebra12345
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#exit

   b. Radio 2 as client bridge radio: example for **PEAP-MSCApV2**
      
      CBMGR-ACTIVE(config-profile-CB-AP6522)#interface radio 2
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#rf-mode bridge
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge ssid TMELABS-DOT1X
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge authentication-type eap
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge encryption-type ccmp
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge eap type tls
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge eap username cb@tmelabs.local
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge eap password zebra
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#exit

   c. Radio 2 as client bridge radio: example for **EAP-TLS**
      
      CBMGR-ACTIVE(config-profile-CB-AP6522)#interface radio 2
      CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#rf-mode bridge
CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge ssid TMELABS-DOT1X
CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge authentication-type eap
CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge encryption-type ccmp
CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge eap type tls
CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge eap username cb@tmelabs.local
CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#bridge eap password zebra
CBMGR-ACTIVE(config-profile-CB-AP6522-if-radio2)#exit

8. Exit the AP6522 profile ‘CB-AP6522’ config context and commit and write changes to memory.
   CBMGR-ACTIVE(config-profile-CB-AP6522)#exit
   CBMGR-ACTIVE(config)#commit write

Define encryption password and enable inline password encryption.
1. Define encryption password.
   CBMGR-ACTIVE(config)#password-encryption secret 2 zebra
2. Enable inline password encryption.
   CBMGR-ACTIVE(config)#inline-password-encryption
3. Commit and write changes to memory.
   CBMGR-ACTIVE(config)#commit write

Configuring centralized controller discovery.
For centrally-managed deployments, AP6522/AP6562 client bridges can discover centralized controllers
(active and standby) and establish level 2 MiNT links using static controller host entries or DHCP options.

a. DHCP options
   AP6522/AP6562 client bridges support dynamic layer 3 discovery using DHCP. DHCP can be used to
   assign network addressing in addition to sending Zebra vendor-specific DHCP option 191, which enables
   AP6522/AP6562 client bridges to automatically discover and adopt to the centralized controllers. DHCP
   option 191 is supplied as ASCII/string to the AP6522/AP6562 client bridges in a DHCP offer, and each string
   includes the IPv4 addresses of the active and standby centralized controllers, Pool, and MiNT routing level.
   To support the AP6522/AP6562 client bridges, DHCP Option 191 must be assigned to each DHCP Pool
   providing addresses to the AP6522/AP6562 client bridges.

b. Layer 3 controller-host discovery using controller-host configuration
   AP6522/AP6562 client bridges support static layer 3 discovery using controller hosts defined in the user-
   defined AP6522 or AP6562 profiles. Controller hosts are typically used for deployments when AP6522/
   AP6562 client bridges are assigned static network addressing or when DHCP options cannot be deployed.
   The AP6522 or AP6562 profile includes up to two controller host entries. The first entry defines the active
   controller’s IPv4 address (pool 1), while the second entry defines the standby controller’s IPv4 address (pool
   2). The MiNT routing level is set 2 for both hosts.

Access the user-defined client-bridge AP6522 profile.
   CBMGR-ACTIVE(config)#profile AP6522 CB-AP6522

Define active and standby centralized controller host entries.
   CBMGR-ACTIVE(config-profile-CB-AP6522)#controller host 192.168.20.90 pool 1 level 2
   CBMGR-ACTIVE(config-profile-CB-AP6522)#controller host 192.168.20.91 pool 2 level 2

Exit then commit and write the changes.
   CBMGR-ACTIVE(config-profile-CB-AP6522)#exit
   CBMGR-ACTIVE(config)#commit write
**Auto-provisioning client-bridge access points.**

In a centrally-managed deployment, each AP6522/AP6562 client bridge is assigned a user-defined profile and RF Domain upon initial adoption to the centralized controller. It is an *auto-provisioning policy*, mapped to the centralized controller’s profile, which assigns the user-defined profile and RF Domain to the new AP6522/AP6562 client bridges. The auto-provisioning policy includes IP=match criteria and corresponding adopt rules. These rules determine the profile and RF Domain to assign to each new AP6522/AP6562 client bridge matching the criteria provided.

1. Create a user-defined auto provisioning policy and enter its config context.

   ```
   CBMGR-ACTIVE(config)#auto-provisioning-policy DATACENTER
   ```

2. Define an adoption rule providing the IP match criteria and the profile and RF Domain to assign in case of a match.

   ```
   CBMGR-ACTIVE(config-auto-provisioning-policy-DATACENTER)#adopt AP6522 precedence 1 profile CB-AP6522 rf-domain STORE201 ip 192.168.21.0/24
   CBMGR-ACTIVE(config-auto-provisioning-policy-DATACENTER)#exit
   ```

3. Map the user-defined auto provisioning policy to the centralized controller profile.

   ```
   CBMGR-ACTIVE(config)#profile nx9000 DATACENTER-NX9000
   CBMGR-ACTIVE(config-profile-DATACENTER-NX9000)#use auto-provisioning-policy DATACENTER
   ```

4. Exit then centralized controller profile ‘DATACENTER-NX9000’ config context and commit and write the changes to memory.

   ```
   CBMGR-ACTIVE(config-profile-NX9000-DATACENTER)#exit
   CBMGR-ACTIVE(config)#commit write
   ```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>no</em></td>
<td>Removes or resets this client-bridge settings</td>
</tr>
</tbody>
</table>
7.1.34.4.14 channel

`interface-config-radio-instance`

Configures a radio’s channel of operation

Only a trained installation professional should define the radio channel. Select Smart for the radio to scan non-overlapping channels listening for beacons from other access points. After the channels are scanned, the radio selects the channel with the fewest access points. In case of multiple access points on the same channel, it selects the channel with the lowest average power level.

**NOTE:** Channels with a “w” appended to them are unique to the 40 MHz band. Channels with a “ww” appended to them are 802.11ac specific, and appear only when using an AP82XX, and are unique to the 80 MHz band.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

`channel [smart|acs|random|1|2|3|4|-------]`

**Parameters**
- `channel [smart|acs|random|1|2|3|4|-------]`

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#channel 1

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  channel 1
  beacon period 50
  beacon dtim-period bss 1 5
  beacon dtim-period bss 2 2
  ..............................................................
  beacon dtim-period bss 14 5
  beacon dtim-period bss 15 5
  beacon dtim-period bss 16 5
  antenna-gain 12.0
  aggregation ampdu tx-only
  aeroscout forward
  antenna-mode 2x2
  antenna-diversity
  --More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**

```
no
```

Resets a radio’s channel of operation
7.1.34.4.15 data-rates

`interface-config-radio-instance`

Configures the 802.11 data rates on this radio

This command sets the rate options depending on the 802.11 protocol and the radio band selected. If 2.4 GHz is selected as the radio band, select separate 802.11b, 802.11g and 802.11n rates and define how they are used in combination. If 5.0 GHz is selected as the radio band, select separate 802.11a and 802.11n rates then define how they are used together.

If dedicating the radio to either 2.4 or 5.0 GHz support, use the `custom` keyword to set a 802.11n modulation and coding scheme (MCS) in respect to the radio’s channel width and guard interval. A MCS defines (based on RF channel conditions) an optimal combination of rates, bonded channels, multiple spatial streams, different guard intervals and modulation types. Clients can associate as long as they support basic MCS (as well as non-11n basic rates).

Data rates are fixed and not user configurable for radios functioning as sensors.

NOTE: Use the `rf-mode` command to configure a radio’s mode of operation.

NOTE: The MCS-1s and MCS-2s options are available for each supported access point. However, the MCS-3s option is only available to the AP8232 model access point, and its ability to provide 3x3x3 MIMO support.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

```
data-rates [b-only|g-only|a-only|bg|bgn|gn|an|default|custom|mcs]
data-rates [b-only|g-only|a-only|bg|bgn|gn|an|default]
data-rates custom [1|2|5.5|6|9|11|12|18|24|36|48|54|mcs-1s|mcs-2s|mcs-3s|basic-1|basic-2|basic-5.5|basic-6|basic-9|basic-11|basic-12|basic-18|basic-24|basic-36|basic-48|basic-54|basic-mcs-1s]
data-rates mcs qam-only
```

Parameters

```
data-rates [b-only|g-only|a-only|bg|bgn|gn|an|default]
```

<table>
<thead>
<tr>
<th>data-rates</th>
<th>Configures the 802.11 data rates on this radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>b-only</td>
<td>Supports operation in the 802.11b mode only (applicable for 2.4 and 4.9 GHz bands)</td>
</tr>
<tr>
<td>g-only</td>
<td>Uses rates that support operation in the 802.11g mode only (applicable for 2.4 and 4.9 GHz bands)</td>
</tr>
<tr>
<td>a-only</td>
<td>Uses rates that support operation in the 802.11a mode only (applicable for 5.0 GHz band only)</td>
</tr>
<tr>
<td>bg</td>
<td>Uses rates that support 802.11b and 802.11g wireless clients (applicable for 2.4 and 4.9 GHz bands)</td>
</tr>
<tr>
<td>bgn</td>
<td>Uses rates that support 802.11b, 802.11g, and 802.11n wireless clients (applicable for 2.4 and 4.9 GHz bands)</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>gn</td>
<td>Uses rates that support 802.11g and 802.11n wireless clients (applicable for 2.4 and 4.9 GHz bands)</td>
</tr>
<tr>
<td>an</td>
<td>Uses rates that support 802.11a and 802.11n wireless clients (applicable for 5.0 GHz band only)</td>
</tr>
<tr>
<td>default</td>
<td>Enables the default data rates according to the radio’s band of operation</td>
</tr>
</tbody>
</table>

- **data-rates custom**: Configures the 802.11 data rates on this radio

  - **custom**: Configures a list of data rates by specifying each rate individually. Use 'basic-' prefix before a rate to indicate it’s used as a basic rate (For example, 'data-rates custom basic-1 basic-2 5.5 11')
  - 1 – 1-Mbps
  - 2 – 2-Mbps
  - 5.5 – 5.5-Mbps
  - 6 – 6-Mbps
  - 9 – 9-Mbps
  - 11 – 11-Mbps
  - 12 – 12-Mbps
  - 18 – 18-Mbps
  - 24 – 24-Mbps
  - 36 – 36-Mbps
  - 48 – 48-Mbps
  - 54 – 54-Mbps
  - mcs-1s – Applicable to 1-spatial stream data rates
  - mcs-2s – Applicable to 2-spatial stream data rates
  - mcs-3s – Applicable to 3-spatial stream data rates (supported only on AP8232 for the MIMO feature)
  - basic-1 – Basic 1-Mbps
  - basic-2 – Basic 2-Mbps
  - basic-5.5 – Basic 5.5-Mbps
  - basic-6 – Basic 6-Mbps
  - basic-9 – Basic 9-Mbps
  - basic-11 – Basic 11-Mbps
  - basic-12 – Basic 12-Mbps
  - basic-18 – Basic 18-Mbps
  - basic-24 – Basic 24-Mbps
  - basic-36 – Basic 36-Mbps
  - basic-48 – Basic 48-Mbps
  - basic-54 – Basic 54-Mbps
  - basic-mcs-1s – Modulation and Coding Scheme data rates for 1 Spatial Stream

Refer to the **Usage Guidelines (Supported data rates)** section for 802.11an and 802.11ac MCS detailed rates for both with and without **short guard intervals (SGI)**.
- **data-rates mcs qam-only**

<table>
<thead>
<tr>
<th>data-rates</th>
<th>Configures the 802.11 data rates on this radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>mcs qam-only</td>
<td>Configures supports for MCS QAM data rates only</td>
</tr>
</tbody>
</table>

**Usage Guidelines (Supported data rates)**

The following table defines the 802.11n MCS for MCS 1 streams, both with and without SGI:

<table>
<thead>
<tr>
<th>MCS-1Stream Index</th>
<th>Number of Streams</th>
<th>20 MHz No SGI</th>
<th>20 MHz With SGI</th>
<th>40 MHz No SGI</th>
<th>20 MHz With SGI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>6.5</td>
<td>7.2</td>
<td>13.5</td>
<td>15</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>13</td>
<td>14.4</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>19.5</td>
<td>21.7</td>
<td>40.5</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>26</td>
<td>28.9</td>
<td>54</td>
<td>60</td>
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<tr>
<td>4</td>
<td>1</td>
<td>39</td>
<td>43.4</td>
<td>81</td>
<td>90</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>52</td>
<td>57.8</td>
<td>108</td>
<td>120</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>58.5</td>
<td>65</td>
<td>121.5</td>
<td>135</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>65</td>
<td>72.2</td>
<td>135</td>
<td>150</td>
</tr>
</tbody>
</table>

The following table defines the 802.11n MCS for MCS 2 streams, both with and without SGI:

<table>
<thead>
<tr>
<th>MCS-2Stream Index</th>
<th>Number of Streams</th>
<th>20 MHz No SGI</th>
<th>20 MHz With SGI</th>
<th>40 MHz No SGI</th>
<th>20 MHz With SGI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>13</td>
<td>14.4</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>26</td>
<td>28.9</td>
<td>54</td>
<td>60</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>39</td>
<td>43.4</td>
<td>81</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>52</td>
<td>57.8</td>
<td>108</td>
<td>120</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>78</td>
<td>86.7</td>
<td>162</td>
<td>180</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>104</td>
<td>115.6</td>
<td>216</td>
<td>240</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>117</td>
<td>130</td>
<td>243</td>
<td>270</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>130</td>
<td>144.4</td>
<td>270</td>
<td>300</td>
</tr>
</tbody>
</table>

The following table defines the 802.11n MCS for MCS 3 streams, both with and without SGI:

<table>
<thead>
<tr>
<th>MCS-3Stream Index</th>
<th>Number of Streams</th>
<th>20 MHz No SGI</th>
<th>20 MHz With SGI</th>
<th>40 MHz No SGI</th>
<th>20 MHz With SGI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>19.5</td>
<td>21.7</td>
<td>40.5</td>
<td>45</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>39</td>
<td>43.3</td>
<td>81</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>58.5</td>
<td>65</td>
<td>121.5</td>
<td>135</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>78</td>
<td>86.7</td>
<td>162</td>
<td>180</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>117</td>
<td>130.7</td>
<td>243</td>
<td>270</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>156</td>
<td>173.3</td>
<td>324</td>
<td>360</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>175.5</td>
<td>195</td>
<td>364.5</td>
<td>405</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>195</td>
<td>216.7</td>
<td>405</td>
<td>450</td>
</tr>
</tbody>
</table>
The following table defines the 802.11ac MCS rates (theoretical throughput for single spatial streams) both with and without SGI:

<table>
<thead>
<tr>
<th>MCS Index</th>
<th>20 MHz No SGI</th>
<th>20 MHz With SGI</th>
<th>40 MHz No SGI</th>
<th>40 MHz With SGI</th>
<th>80 MHz No SGI</th>
<th>80 MHz With SGI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6.5</td>
<td>7.2</td>
<td>13.5</td>
<td>15</td>
<td>29.3</td>
<td>32.5</td>
</tr>
<tr>
<td>1</td>
<td>13</td>
<td>14.4</td>
<td>27</td>
<td>30</td>
<td>58.5</td>
<td>65</td>
</tr>
<tr>
<td>2</td>
<td>19.5</td>
<td>21.7</td>
<td>40.5</td>
<td>45</td>
<td>87.8</td>
<td>97.5</td>
</tr>
<tr>
<td>3</td>
<td>26</td>
<td>28.9</td>
<td>54</td>
<td>60</td>
<td>117</td>
<td>130</td>
</tr>
<tr>
<td>4</td>
<td>39</td>
<td>43.3</td>
<td>81</td>
<td>90</td>
<td>175.5</td>
<td>195</td>
</tr>
<tr>
<td>5</td>
<td>52</td>
<td>57.8</td>
<td>108</td>
<td>120</td>
<td>234</td>
<td>260</td>
</tr>
<tr>
<td>6</td>
<td>58.5</td>
<td>65</td>
<td>121.5</td>
<td>135</td>
<td>263.3</td>
<td>292.5</td>
</tr>
<tr>
<td>7</td>
<td>65</td>
<td>72.2</td>
<td>135</td>
<td>150</td>
<td>292.5</td>
<td>325</td>
</tr>
<tr>
<td>8</td>
<td>78</td>
<td>86.7</td>
<td>162</td>
<td>180</td>
<td>351</td>
<td>390</td>
</tr>
<tr>
<td>9</td>
<td>N/A</td>
<td>N/A</td>
<td>180</td>
<td>200</td>
<td>390</td>
<td>433.3</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#data-rates b-only

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  channel 1
    data-rates b-only
      beacon period 50
      beacon dtim-period bss 1 5
      beacon dtim-period bss 2 2
      beacon dtim-period bss 3 5
      ........................................................
      beacon dtim-period bss 13 5
      beacon dtim-period bss 14 5
      beacon dtim-period bss 15 5
      beacon dtim-period bss 16 5
      antenna-gain 12.0
      aggregation ampdu tx-only
      aeroscout forward
--More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

Related Commands

- `no` | Resets the 802.11 data rates on a radio
- `rf-mode` | Configures the radio’s RF mode of operation
7.1.34.4.16 description

*interface-config-radio-instance*

Configures the selected radio’s description that helps differentiate it from other radios with similar configurations

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**
description <WORD>

**Parameters**
- description <WORD>

<table>
<thead>
<tr>
<th>description &lt;WORD&gt;</th>
<th>Provide a description for the selected radio (should not exceed 64 characters in length).</th>
</tr>
</thead>
</table>

**Examples**
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#description "Primary radio to use"
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context interface radio1
description "Primary radio to use"
  channel 1
  data-rates b-only
  beacon period 50
  beacon dtim-period bss 1 5
  beacon dtim-period bss 2 2
  beacon dtim-period bss 3 5
  beacon dtim-period bss 4 5
  beacon dtim-period bss 5 5
  beacon dtim-period bss 6 5
  beacon dtim-period bss 7 5
  beacon dtim-period bss 8 5
  beacon dtim-period bss 9 5
  beacon dtim-period bss 10 5
  beacon dtim-period bss 11 5
  beacon dtim-period bss 12 5
  beacon dtim-period bss 13 5
  beacon dtim-period bss 14 5
  beacon dtim-period bss 15 5
  beacon dtim-period bss 16 5
  antenna-gain 12.0
  aggregation ampdu tx-only
  --More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

**Related Commands**

| no | Removes a radio’s description |
7.1.34.4.17 dfs-rehome

Reverts to configured home channel once the Dynamic Frequency Selection (DFS) evacuation period expires.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax
dfs-rehome {holdtime <30-3600>}

Parameters
- dfs-rehome {holdtime <30-3600>}

Examples
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#dfs-rehome holdtime 500
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
  interface radio1
dfs-rehome holdtime 500
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands
- no Stays on DFS elected channel after evacuation period expires

NOTE: This option is applicable only if the radio’s RF mode is set to ‘5GHz-wlan’.
7.1.34.4.18 dynamic-chain-selection

Enables automatic antenna mode selection. When enabled, the radio can dynamically change the number of transmit chains used (uses a single chain/antenna for frames at non-11n transmit rates). This option is enabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

dynamic-chain-selection

Parameters

None

Examples

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#dynamic-chain-selection
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands

| no          | Uses the configured transmit antenna mode for all clients |
7.1.34.4.19 ekahau

/ interface-config-radio-instance

Enables Ekahau multicast packet forwarding. When enabled, Ekahau small, battery powered Wi-Fi tags are attached to tracked assets or assets carried by people. Ekahau processes locations, rules, messages, and environmental data and turns the information into locationing maps, alerts and reports.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

ekahau [forward ip <IP> port <0-65535>|mac <MAC>]

Parameters

- **forward ip <IP> port <0-65535>|mac <MAC>**

  - `<IP>` – Configures the IP address of the Ekahau engine in the A.B.C.D format
  - `<MAC>` – Specify the MAC address in the AA-BB-CC-DD-EE-FF format.

Examples

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#ekahau forward ip 172.16.10.1 port 3

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context interface radio1
description "Primary radio to use"
  channel 1
data-rates b-only
  beacon period 50
  beacon dtim-period bss 1 5
  beacon dtim-period bss 2 2
  beacon dtim-period bss 3 5
  beacon dtim-period bss 4 5
  beacon dtim-period bss 5 5
  beacon dtim-period bss 6 5
  beacon dtim-period bss 7 5
  ..................................................
  beacon dtim-period bss 16 5
  antenna-gain 12.0
  aggregation ampdu tx-only
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  antenna-mode 2x2
  --More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands

- **no** — Uses default Ekahau multicast MAC address
7.1.34.4.20 extended-range

- **interface-config-radio-instance**

Enables the extended range capability for AP7161 and AP7181 model access points. When enabled, these access points can exchange signals with their clients at greater distances without being timed out. This option is disabled by default.

Supported in the following platforms:
- Access Point — AP7161, AP7181

**Syntax**

```
extended-range <1-25>
```

**Parameters**

- `extended-range <1-25>`

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#extended-range 15
```

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  description "Primary radio to use"
  channel 1
  data-rates b-only
  beacon period 50
  beacon dtim-period bss 1 5
  beacon dtim-period bss 2 2
  beacon dtim-period bss 3 5
  beacon dtim-period bss 4 5
  beacon dtim-period bss 5 5
  beacon dtim-period bss 6 5
  beacon dtim-period bss 7 5
  beacon dtim-period bss 8 5
  beacon dtim-period bss 9 5
  beacon dtim-period bss 10 5
  beacon dtim-period bss 11 5
  beacon dtim-period bss 12 5
  beacon dtim-period bss 13 5
  beacon dtim-period bss 14 5
  beacon dtim-period bss 15 5
  beacon dtim-period bss 16 5
  antenna-gain 12.0
  aggregation ampdu tx-only
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  antenna-mode 2x2
  antenna-diversity
  airtime-fairness prefer-ht weight 6
  extended-range 15
  --More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets the extended range to default (7 km for 2.4 GHz and 5 km for 5.0 GHz)</td>
</tr>
</tbody>
</table>
### 7.1.34.4.21 fallback-channel

**interface-config-radio-instance**

Configures the channel to which the radio switches in case of radar detection on the current channel

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```plaintext
fallback-channel [100|100w|100ww|104|104w|104ww|108|108w.............]
```

**Parameters**

- `fallback-channel [100|100w|100ww|104|104w|104ww|108|108w.............]`

| fallback-channel [100|100w[........] | Configures the fallback channel. This is the channel the radio switches to in case a radar is detected on the radio’s current operating channel.
| | • [100|100w[100ww[...]] – Select the fall back channel from the available options.
| | **Note:** Channels with a “w” appended to them are unique to the 40 MHz band. Channels with a “ww” appended to them are 802.11ac specific, and appear only when using an AP8232, and are unique to the 80 MHz band.

**Examples**

```plaintext
nx9500-6C8809(config-profile-testAP81XX-if-radio2)#fallback-channel 104
```

NOTE: Functionality is supported only in the US regulatory domain and only a non-dfs channel can be configured as a fallback channel

```plaintext
nx9500-6C8809(config-profile-testAP81XX-if-radio2)#show context
  interface radio2
      fallback-channel 104
```

```plaintext
nx9500-6C8809(config-profile-testAP81XX-if-radio2)#
```

**Related Commands**

| no | Removes the fallback-channel configuration |
7.1.34.4.22 guard-interval

`interface-config-radio-instance`

Configures the 802.11n guard interval. A guard interval ensures distinct transmissions do not interfere with one another. It provides immunity to propagation delays, echoes and reflection of radio signals.

The guard interval is the space between transmitted characters. The guard interval eliminates *inter symbol interference* (ISI). ISI which occurs when echoes or reflections from one symbol interferes with another. Adding time between transmissions allows echoes and reflections to settle before the next symbol is transmitted. A shorter guard interval results in shorter symbol times, which reduces overhead and increases data rates by up to 10%.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```
guard-interval [any|long]
```

**Parameters**

- `guard-interval [any|long]`

<table>
<thead>
<tr>
<th>Guard Interval</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>Enables the radio to use any short (400nSec) or long (800nSec) guard interval</td>
</tr>
<tr>
<td>long</td>
<td>Enables the use of long guard interval (800nSec). This is the default setting.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#guard-interval long

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
  interface radio1
    description "Primary radio to use"
    channel 1
    data-rates b-only
    beacon period 50
    beacon dtim-period bss 1 5
    beacon dtim-period bss 2 2
    beacon dtim-period bss 3 5
    beacon dtim-period bss 4 5
    beacon dtim-period bss 5 5
    beacon dtim-period bss 6 5
    beacon dtim-period bss 7 5
    beacon dtim-period bss 8 5
    beacon dtim-period bss 9 5
    beacon dtim-period bss 10 5
    beacon dtim-period bss 11 5
    beacon dtim-period bss 12 5
    beacon dtim-period bss 13 5
    beacon dtim-period bss 14 5
    beacon dtim-period bss 15 5
    beacon dtim-period bss 16 5
    antenna-gain 12.0
    --More--
    guard-interval long
    --More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**

```
no
```

Resets the 802.11n guard interval to default (long: 800nSec)
7.1.34.4.23 ldpc

- interface-config-radio-instance

Enables support for Low Density Parity Check (LDPC) codes on the radio interface.
LDPC consists of forward error correcting codes that enable error control in data transmission. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax
ldpc

Parameters
None

Examples
rfs4000-229D58(config-profile-Test81XX-if-radio1)#ldpc
rfs4000-229D58(config-profile-Test81XX-if-radio1)#show context interface radio1
  ldpc
rfs4000-229D58(config-profile-Test81XX-if-radio1)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables LDPC support</td>
</tr>
</tbody>
</table>
7.1.34.4.24 lock-rf-mode

- **interface-config-radio-instance**

Retains user configured RF mode settings for the selected radio. This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```
lock-rf-mode
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#lock-rf-mode
```

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
```

```
text
interface radio1
description "Primary radio to use"
channel 1
data-rates b-only
beacon period 50
beacon dtim-period bss 1 5
beacon dtim-period bss 2 2
beacon dtim-period bss 3 5
beacon dtim-period bss 4 5
beacon dtim-period bss 5 5
beacon dtim-period bss 6 5
beacon dtim-period bss 7 5
beacon dtim-period bss 8 5
beacon dtim-period bss 9 5
beacon dtim-period bss 10 5
beacon dtim-period bss 11 5
beacon dtim-period bss 12 5
beacon dtim-period bss 13 5
beacon dtim-period bss 14 5
beacon dtim-period bss 15 5
beacon dtim-period bss 16 5
antenna-gain 12.0
guard-interval long
aggregation ampdru tx-only
aeroscout forward
ekahau forward ip 172.16.10.1 port 3
antenna-mode 2x2
antenna-diversity
airtime-fairness prefer-ht weight 6
lock-rf-mode
extended-range 15
```

```
--More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Allows Smart RF to change a radio’s RF mode settings</td>
</tr>
</tbody>
</table>
### 7.1.34.4.25 max-clients

#### interface-config-radio-instance

Configures the maximum number of wireless clients allowed to associate with this radio

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

#### Syntax

`max-clients <0-256>`

#### Parameters

- `max-clients <0-256>`

<table>
<thead>
<tr>
<th>max-clients &lt;0-256&gt;</th>
<th>Configures the maximum number of clients allowed to associate with a radio, subject to the access point's limit. Specify a value from 0 - 256. The default is 256. Note: The AP6511 and AP6521 model access points can only support 128 clients.</th>
</tr>
</thead>
</table>

#### Examples

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#max-clients 100
```

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  description "Primary radio to use"
  channel 1
  data-rates b-only
  beacon period 50
  beacon dtim-period bss 1 5
  beacon dtim-period bss 2 2
  .........................................................
  beacon dtim-period bss 12 5
  beacon dtim-period bss 13 5
  beacon dtim-period bss 14 5
  beacon dtim-period bss 15 5
  beacon dtim-period bss 16 5
  antenna-gain 12.0
  guard-interval long
  aggregation ampu tx-only
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  antenna-mode 2x2
  antenna-diversity
  max-clients 100
  airtime-fairness prefer-ht weight 6
  lock-rf-mode
  extended-range 15
  antenna-downtilt
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

#### Related Commands

- `no` Resets the maximum number of wireless clients allowed to associate with a radio
### 7.1.34.4.26 mesh

Use this command to configure radio mesh parameters. A Wireless Mesh Network (WMN) is a network of radio nodes organized in a mesh topology. It consists of mesh clients, mesh routers, and gateways.

Each radio setting can have a unique mesh mode and link configuration. This provides a customizable set of connections to other mesh supported radios within the same radio coverage area.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

#### Syntax

```
mesh [client|links|portal|preferred-peer|psk]
mesh [client|links <1-6>|portal|preferred-peer <1-6> <MAC>|psk [0 <LINE>|2 <LINE>| <LINE>]]
```

#### Parameters

- **mesh [client|links|portal|preferred-peer|psk]**
  - **mesh** Configures radio mesh parameters, such as maximum number of mesh links, preferred peer device, client operations, etc.
  - **client** Enables operation as a client
  - Setting the mesh mode to 'client' enables the radio to operate as a mesh client that scans for and connects to mesh portals or nodes that are connected to portals.
  - **links <1-6>** Configures the maximum number of mesh links a radio attempts to create
    - <1-6> – Sets the maximum number of mesh links from 1 - 6. The default is 6.
  - **portal** Enables operation as a portal
  - Setting the mesh mode to 'portal' turns the radio into a mesh portal. The radio starts beaconing immediately and accepts connections from other mesh nodes, typically the node with a connection to the wired network.
  - **preferred-peer <1-6> <MAC>** Configures a preferred peer device
    - <1-6> – Configures the priority at which the peer node will be added
    - When connecting to the mesh infrastructure, nodes with lower priority are given precedence over nodes with higher priority.
    - <MAC> – Sets the MAC address of the preferred peer device (Ethernet MAC of either a AP, wireless controller, or service platform with onboard radios)
  - **psk [0 <LINE>|2 <LINE>| <LINE>]** Configures the pre-shared key. Ensure this key is configured on the access point when staged for mesh, and added to the mesh client and to the portal access point's configuration on the controller or service platform.
    - 0 <LINE> – Enter a clear text key
    - 2 <LINE> – Enter an encrypted key
    - <LINE> – Enter the pre-shared key
  - Pre-shared keys should be 8 - 64 characters in length.
Examples

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#mesh client

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context interface radio1
description "Primary radio to use"
channel 1
data-rates b-only
mesh client
beacon period 50
--More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables mesh mode operation of the selected radio</td>
</tr>
</tbody>
</table>
7.1.34.4.27 meshpoint

Maps an existing meshpoint to this radio

Use this command to assign each WLAN its own BSSID. If using a single-radio access point, there are 8 BSSIDs available. If using a dual-radio access point there are 8 BSSIDs for the 802.11b/g/n radio and 8 BSSIDs for the 802.11a/n radio.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax
meshpoint <MESHPOINT-NAME> {bss <1-16>}

Parameters
- meshpoint <MESHPOINT-NAME> {bss <1-16>}

<table>
<thead>
<tr>
<th>meshpoint &lt;MESHPOINT-NAME&gt;</th>
<th>Maps a meshpoint to this radio. Specify the meshpoint name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>bss &lt;1-16&gt;</td>
<td>Optional. Specifies the radio’s BSS where this meshpoint is mapped</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-16&gt; – Specify the BSS number from 1 - 16.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-profile-ap71xxTest-if-radio1)#meshpoint test bss 7
rfs7000-37FABE(config-profile-ap71xxTest-if-radio1)#show context
interface radio1
  meshpoint test bss 7
rfs7000-37FABE(config-profile-ap71xxTest-radio1)#

Related Commands
no Disables meshpoint on the selected radio
7.1.34.4.28 no

Negates a command or resets settings to their default. When used in the profile/device > radio interface configuration mode, the no command disables or resets radio interface settings.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

no <PARAMETERS>

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes or reverts this radio interface’s settings based on the parameters passed |

Usage Guidelines

The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

Examples

rfs7000-37FABE(config-profile-ap71xxTest-if-radio1)#no ?

adaptivity Adaptivity
aeroscout Use Default Aeroscout Multicast MAC Address
aggregation Configure 802.11n aggregation related parameters
airtime-fairness Disable fair access to medium for clients, provide access in a round-robin mode
antenna-diversity Use single antenna for non-11n transmit rates
antenna-downtilt Reset ADEPT antenna mode
antenna-elevation Reset the antenna elevation of this radio to default
antenna-gain Reset the antenna gain of this radio to default
antenna-mode Reset the antenna mode (number of transmit and receive antennas) on the radio to its default
assoc-response Configure transmission parameters for Association Response frames
association-list Configure the association list for the radio
beacon Configure beacon parameters
bridge Bridge rf-mode related configuration
channel Reset the channel of operation of this radio to default
data-rates Reset radio data rate configuration to default
description Reset the description of the radio to its default
dfs-rehome Stay on dfs elected channel after evacuation period expires
dynamic-chain-selection Use the configured transmit antenna mode for all clients
ekahau Use Default Ekahau Multicast MAC Address
extended-range Reset extended range to default
fallback-channel Clear the DFS fallback channel for this radio
guard-interval Configure default value of 802.11n guard interval (long: 800nSec)
ldpc Configure support for Low Density Parity Check Code
lock-rf-mode Allow smart-rf to change rf-mode setting for this radio
max-clients Maximum number of wireless clients allowed to associate
mesh Disable mesh mode operation of the radio
meshpoint Disable a meshpoint from this radio
non-unicast Configure handling of non-unicast frames
<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>off-channel-scan</td>
<td>Disable off-channel scanning on the radio</td>
</tr>
<tr>
<td>placement</td>
<td>Reset the placement of the radio to its default</td>
</tr>
<tr>
<td>power</td>
<td>Reset the transmit power of this radio to default</td>
</tr>
<tr>
<td>preamble-short</td>
<td>Disable the use of short-preamble on this radio</td>
</tr>
<tr>
<td>probe-response</td>
<td>Configure transmission parameters for Probe Response frames</td>
</tr>
<tr>
<td>radio-resource-measurement</td>
<td>Configure support for 802.11k Radio Resource Measurement</td>
</tr>
<tr>
<td>radio-share-mode</td>
<td>Configure the radio-share mode of operation for this radio</td>
</tr>
<tr>
<td>rate-selection</td>
<td>Monotonic rate selection</td>
</tr>
<tr>
<td>rf-mode</td>
<td>Reset the RF mode of operation for this radio to default (2.4GHz on radio1, 5GHz on radio2, sensor on radio3)</td>
</tr>
<tr>
<td>rifs</td>
<td>Configure Reduced Interframe Spacing (RIFS) parameters</td>
</tr>
<tr>
<td>rts-threshold</td>
<td>Reset the RTS threshold to its default (65536)</td>
</tr>
<tr>
<td>shutdown</td>
<td>Re-enable the selected interface</td>
</tr>
<tr>
<td>smart-rf</td>
<td>Reset smart-rf related configuration to default</td>
</tr>
<tr>
<td>sniffer-redirect</td>
<td>Disable capture and redirection of packets</td>
</tr>
<tr>
<td>stbc</td>
<td>Configure Space-Time Block Coding (STBC) parameters</td>
</tr>
<tr>
<td>transmit-beamforming</td>
<td>Disable Transmit Beamforming</td>
</tr>
<tr>
<td>use</td>
<td>Set setting to use</td>
</tr>
<tr>
<td>wips</td>
<td>Wireless intrusion prevention related configuration</td>
</tr>
<tr>
<td>wireless-client</td>
<td>Configure wireless client related parameters</td>
</tr>
<tr>
<td>wlan</td>
<td>Disable a wlan from this radio</td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
</tbody>
</table>

The following example shows radio interface settings before the 'no' commands are executed:

```
rfs7000-37FABE(config-profile-ap71xxTest-if-radio1)#
```

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
```

```
interface radio1
  description "Primary radio to use"
  channel 1
  data-rates b-only
  mesh client
  beacon period 50
  beacon dtim-period bss 1 5
  beacon dtim-period bss 2 2
  beacon dtim-period bss 3 5
  beacon dtim-period bss 4 5
  beacon dtim-period bss 5 5
  beacon dtim-period bss 6 5
  beacon dtim-period bss 7 5
  beacon dtim-period bss 8 5
  beacon dtim-period bss 9 5
  beacon dtim-period bss 10 5
  beacon dtim-period bss 11 5
  beacon dtim-period bss 12 5
  beacon dtim-period bss 13 5
  beacon dtim-period bss 14 5
  beacon dtim-period bss 15 5
  beacon dtim-period bss 16 5
  antenna-gain 12.0
  guard-interval long
  aggregation ampdru tx-only
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  antenna-mode 2x2
  antenna-diversity
  max-clients 100
  airtime-fairness prefer-ht weight 6
  lock-rf-mode
  extended-range 15
```
antenna-downtilt
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#no channel
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#no antenna-gain
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#no description
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#no antenna-mode
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#no beacon dtim-period
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#no beacon period

The following example shows radio interface settings after the ‘no’ commands are executed:

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  data-rates b-only
  mesh client
  guard-interval long
  aggregation ampdu tx-only
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  antenna-diversity
  max-clients 100
  airtime-fairness prefer-ht weight 6
  lock-rf-mode
  extended-range 15
  antenna-downtilt
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
7.1.34.4.29 non-unicast

`interface-config-radio-instance`

Configures support for forwarding of non-unicast (multicast and broadcast) frames on this radio.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```
non-unicast [forwarding|queue|tx-rate]
```

```
non-unicast forwarding [follow-dtim|power-save-aware]
```

```
non-unicast queue [<1-200>|bss]
```

```
non-unicast queue [<1-200>|bss <1-16> <1-200>]
```

```
non-unicast tx-rate [bss <1-16]|dynamic-all|dynamic-basic|highest-basic|lowest-basic]
```

```
non-unicast tx-rate bss <1-16> [dynamic-all|dynamic-basic|highest-basic|lowest-basic]
```

**Parameters**

- **non-unicast forwarding [follow-dtim|power-save-aware]**
  - **follow-dtim** Specifies frames always wait for the DTIM interval to time out. The DTIM interval is configured using the `beacon` command. This is the default setting.
  - **power-save-aware** Enables immediate forwarding of frames only if all associated wireless clients are in the power save mode.

- **non-unicast queue [<1-200>|bss <1-16> <1-200>]**
  - **<1-200>** Specify a number from 1 - 200. This value applies to all BSSs. The default is 50 frames per BSS.
  - **bss <1-16> <1-200>** Overrides the default on a specified BSS
    - **<1-16>** – Select the BSS number from 1 - 16.
    - **<1-200>** – Specify the number of broadcast packets queued for the selected BSS from 1 - 200.

- **non-unicast tx-rate [bss <1-16]|dynamic-all|dynamic-basic|highest-basic|lowest-basic]**
  - **bss <1-16>** Overrides the default on a specified BSS
    - **<1-16>** – Select the BSS number from 1 - 16. The transmit rate selected is applied only to the BSS specified here. The tx-rate options are: dynamic-all, dynamic-basic, highest-basic, lowest-basic.
  - **dynamic-all** Dynamically selects a rate from all supported rates based on current traffic conditions.
<table>
<thead>
<tr>
<th>dynamic-basic</th>
<th>Dynamically selects a rate from all supported basic rates based on current traffic conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>highest-basic</td>
<td>Uses the highest configured basic rate. This is the default setting.</td>
</tr>
<tr>
<td>lowest-basic</td>
<td>Uses the lowest configured basic rate</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#non-unicast queue bss 2 3
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#non-unicast tx-rate bss 1 dynamic-all
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
```

- interface radio1
- data-rates b-only
- mesh client
- guard-interval long
- aggregation amrdu tx-only
- aeroscout forward
- ekahau forward ip 172.16.10.1 port 3
- non-unicast tx-rate bss 1 dynamic-all
- non-unicast tx-rate bss 2 highest-basic
- non-unicast tx-rate bss 3 highest-basic
- non-unicast tx-rate bss 4 highest-basic
- non-unicast tx-rate bss 5 highest-basic
- non-unicast tx-rate bss 6 highest-basic
- non-unicast tx-rate bss 7 highest-basic
- non-unicast tx-rate bss 8 highest-basic
- non-unicast tx-rate bss 9 highest-basic
- non-unicast tx-rate bss 10 highest-basic
- non-unicast tx-rate bss 11 highest-basic
- non-unicast tx-rate bss 12 highest-basic
- non-unicast tx-rate bss 13 highest-basic
- non-unicast tx-rate bss 14 highest-basic
- non-unicast tx-rate bss 15 highest-basic
- non-unicast tx-rate bss 16 highest-basic
- non-unicast queue bss 1 50
- non-unicast queue bss 2 3
- non-unicast queue bss 3 50
- non-unicast queue bss 4 50
- non-unicast queue bss 5 50
- non-unicast queue bss 6 50
- non-unicast queue bss 7 50
- non-unicast queue bss 8 50
- non-unicast queue bss 9 50
- non-unicast queue bss 10 50
- non-unicast queue bss 11 50
- non-unicast queue bss 12 50
- non-unicast queue bss 13 50
- non-unicast queue bss 14 50
- non-unicast queue bss 15 50
- non-unicast queue bss 16 50
- antenna-diversity
- max-clients 100
- airtime-fairness prefer-ht weight 6
- lock-rf-mode
- extended-range 15
- antenna-downtilt
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**

| no | Resets the handling of non-unicast frames to its default |
### 7.1.34.4.30 off-channel-scan

Enables off channel scanning on this radio. This option is disabled by default.

Channel scanning uses the access point’s resources and is time consuming. Therefore, enable this option only if the radio has the bandwidth to support channel scan without negatively impacting client support.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```plaintext
off-channel-scan {channel-list|max-multicast|scan-interval|sniffer-redirect}
```

#### Parameters

- **channel-list**
  - Optional. Selects the 2.4GHz or 5GHz access point radio band. Restricting off channel scans to specific channels frees bandwidth otherwise utilized for scanning across all channels.
  - **2.4GHz** – Selects the 2.4 GHz band
  - **5GHz** – Selects the 5.0 GHz band

- **<CHANNEL-LIST>**
  - Optional. Specifies a list of 20 MHz, 40 MHz, or 80 MHz channels for the selected band (the channels are separated by commas or hyphens)

- **max-multicast <0-100>**
  - Optional. Configures the maximum multicast/broadcast messages used to perform OCS
  - **<0-100>** – Specify a value from 0 - 100. The default is 4.

- **scan-interval <2-100>**
  - Optional. Configures the scan interval in dtims
  - **<2-100>** – Specify a value from 2 - 100. The default is 20 dtims.

- **sniffer-redirect tzsp <IP>**
  - Optional. Captures and redirects packets to a host running a packet capture/analysis tool. Use this command to configure the IP address of the host.
  - **tzsp** – Encapsulates captured packets in TZSP before redirecting to the specified host
  - **<IP>** – Specify the destination device IP address.
Examples
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#off-channel-scan channel-list 2.4GHz 1

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
data-rates b-only
mesh client
off-channel-scan channel-list 2.4GHz 1
guard-interval long
aggregation ampdu tx-only
aeroscout forward
ekahau forward ip 172.16.10.1 port 3
non-unicast tx-rate bss 1 dynamic-all
non-unicast tx-rate bss 2 highest-basic
non-unicast tx-rate bss 3 highest-basic
non-unicast tx-rate bss 4 highest-basic
non-unicast tx-rate bss 5 highest-basic
non-unicast tx-rate bss 6 highest-basic
non-unicast tx-rate bss 7 highest-basic
non-unicast tx-rate bss 8 highest-basic
non-unicast tx-rate bss 9 highest-basic
non-unicast tx-rate bss 10 highest-basic
non-unicast tx-rate bss 11 highest-basic
non-unicast tx-rate bss 12 highest-basic
non-unicast tx-rate bss 13 highest-basic
non-unicast tx-rate bss 14 highest-basic
non-unicast tx-rate bss 15 highest-basic
--More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables radio off channel scanning</td>
</tr>
</tbody>
</table>
7.1.34.4.31 placement

**interface-config-radio-instance**

Defines the radio's location (whether the radio is deployed indoors or outdoors). The radio’s placement should depend on the country of operation selected and its regulatory domain requirements for radio emissions.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

placement [indoor|outdoor]

**Parameters**

- placement [indoor|outdoor]

<table>
<thead>
<tr>
<th>placement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>indoor</td>
<td>Radio is deployed indoors (uses indoor regulatory rules). This is the default setting.</td>
</tr>
<tr>
<td>outdoor</td>
<td>Radio is deployed outdoors (uses outdoor regulatory rules)</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#placement outdoor

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  data-rates b-only
  placement outdoor
  mesh client
  off-channel-scan channel-list 2.4GHz 1
  guard-interval long
  aggregation ampdu tx-only
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  non-unicast tx-rate bss 1 dynamic-all
  non-unicast tx-rate bss 2 highest-basic
  non-unicast tx-rate bss 3 highest-basic
  non-unicast tx-rate bss 4 highest-basic
  non-unicast tx-rate bss 5 highest-basic
  non-unicast tx-rate bss 6 highest-basic
  non-unicast tx-rate bss 7 highest-basic
  non-unicast tx-rate bss 8 highest-basic
  non-unicast tx-rate bss 9 highest-basic
  non-unicast tx-rate bss 10 highest-basic
  non-unicast tx-rate bss 11 highest-basic
  non-unicast tx-rate bss 12 highest-basic
  non-unicast tx-rate bss 13 highest-basic
  non-unicast tx-rate bss 14 highest-basic

--More--

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

**Related Commands**

- no | Resets a radio’s deployment location
7.1.34.4.32 power

`interface-config-radio-instance`

Configures the radio’s transmit power setting

The transmit power control (TPC) mechanism automatically reduces the used transmission output power when other networks are within range. Reduced power results in reduced interference issues and increased battery capacity.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

```
power [<1-30>|smart]
```

Parameters

- `power [<1-30]|smart]`

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;1-30&gt;</code></td>
<td>Configures the transmit power from 1 - 30 dBm (actual power could be lower based on regulatory restrictions) For APs with dual or three radios, each radio should be configured with a unique transmit power in respect to its intended client support function.</td>
</tr>
<tr>
<td><code>smart</code></td>
<td>Enables Smart RF to determine the optimum transmit power needed. By default APs use Smart RF to determine transmit power.</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE (config-profile-71xxTestProfile-if-radio1)#power 12
```

```
rfs7000-37FABE (config-profile-71xxTestProfile-if-radio1)#show context interface radio1
    power 12
    data-rates b-only
    placement outdoor
    mesh client
    off-channel-scan channel-list 2.4GHz 1
    guard-interval long
    aggregation ampdu tx-only
    aeroscout forward
    ekahau forward ip 172.16.10.1 port 3
    non-unicast tx-rate bss 1 dynamic-all
    non-unicast tx-rate bss 2 highest-basic
    non-unicast tx-rate bss 3 highest-basic
    non-unicast tx-rate bss 4 highest-basic
    non-unicast tx-rate bss 5 highest-basic
    non-unicast tx-rate bss 6 highest-basic
    non-unicast tx-rate bss 7 highest-basic

    --More--
```

```
rfs7000-37FABE (config-profile-71xxTestProfile-if-radio1)#
```

Related Commands

```
no
```

Resets a radio’s transmit power
7.1.34.4.33 preamble-short

*interface-config-radio-instance*

Enables short preamble on this radio. If using an 802.11bg radio, enable short preamble. Short preambles improve throughput. However, some devices (SpectraLink phones) require long preambles. This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

preamble-short

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#preamble-short
```

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  power 12
  data-rates b-only
  placement outdoor
  mesh client
  off-channel-scan channel-list 2.4GHz 1
  **preamble-short**
  guard-interval long
  aggregation ampdu tx-only
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  non-unicast tx-rate bss 1 dynamic-all
  non-unicast tx-rate bss 2 highest-basic
  non-unicast tx-rate bss 3 highest-basic
  non-unicast tx-rate bss 4 highest-basic
  non-unicast tx-rate bss 5 highest-basic
  non-unicast tx-rate bss 6 highest-basic
  non-unicast tx-rate bss 7 highest-basic
  non-unicast tx-rate bss 8 highest-basic
  non-unicast tx-rate bss 9 highest-basic
  non-unicast tx-rate bss 10 highest-basic
  non-unicast tx-rate bss 11 highest-basic
  non-unicast tx-rate bss 12 highest-basic
  --More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**

| no | Disables the use of short preamble on a radio |
7.1.34.4.34 probe-response

Configure transmission parameters for probe response frames

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

```
probe-response [rate|retry|rssi-threshold]
```

- `probe-response retry`
- `probe-response rate [follow-probe-request|highest-basic|lowest-basic]`
- `probe-response rssi-threshold <-128--40>`

Parameters

- `probe-response retry`
  Enables retransmission of probe-response frames if no acknowledgement is received from the client. This option is enabled by default.

- `probe-response rate [follow-probe-request|highest-basic|lowest-basic]`
  Configures the rates used for transmission of probe response frames. The tx-rate options available for transmitting probe response frames are: follow-probe-request, highest-basic, lowest-basic.

- `follow-probe-request`
  Transmits probe responses at the same rate as the received request (default setting)

- `highest-basic`
  Uses the highest configured basic rate

- `lowest-basic`
  Uses the lowest configured basic rate

- `probe-response rssi-threshold <-128--40>`
  Ignores probe request from client if the received signal strength is less than the RSSI threshold specified here
  `<-128--40>` – Specify a value from -128 - -40.

Examples

```
nx9500-6C8809(config-profile-testAP71XX-if-radio1)#probe-response rate highest-basic
nx9500-6C8809(config-profile-testAP71XX-if-radio1)#probe-response retry
nx9500-6C8809(config-profile-testAP71XX-if-radio1)#probe-response rssi-threshold -60
nx9500-6C8809(config-profile-testAP71XX-if-radio1)#show context
  interface radio1
  probe-response rate highest-basic
  probe-response rssi-threshold -60
nx9500-6C8809(config-profile-testAP71XX-if-radio1)#
```

Related Commands

- `no`
  Resets transmission parameters for probe response frames
**7.1.34.4.35 radio-resource-measurement**

*interface-config-radio-instance*

Enables 802.11k radio resource measurement. When enabled, the radio station sends channel and neighbor reports.

The IEEE 802.11 Task Group k defined a set of specifications regarding radio resource measurements. These specifications specify the radio resources to be measured and the mechanism used to communicate measurement requests and results.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```
radio-resource-measurement [attenuation-threshold <1-199>|max-entries <1-12>]
```

**Parameters**

- **radio-resource-measurement [attenuation-threshold <1-199>|max-entries <1-12>]**

<table>
<thead>
<tr>
<th>parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>radio-resource-measurement</td>
<td>Enables 802.11k radio resource measurement on the radio</td>
</tr>
<tr>
<td>attenuation-threshold</td>
<td>Configures the neighbor attenuation threshold, considered when generating channel and neighbor reports</td>
</tr>
<tr>
<td>max-entries</td>
<td>Configures the maximum number of entries to include in channel and neighbor reports</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-if-radio1)#radio-resource-measurement attenuation-threshold 20
rfs4000-229D58(config-device-00-23-68-22-9D-58-if-radio1)#radio-resource-measurement max-entries 10
```

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-if-radio1)#show context interface radio1
  radio-resource-measurement max-entries 10
  radio-resource-measurement attenuation-threshold 20
rfs4000-229D58(config-device-00-23-68-22-9D-58-if-radio1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables 802.11k radio resource measurement support</td>
</tr>
</tbody>
</table>
7.1.34.4.36 radio-share-mode

Configs the radio's mode of operation as radio share. A radio operating in the radio share mode services clients and also performs sensor functions (defined by the radio's AirDefense Services Platform (ADSP) licenses and profiles).

NOTE: The sensor capabilities of the radio are restricted to the channel and WLANs defined on the radio.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax
radio-share-mode [inline|off|promiscuous]

Parameters
- radio-share-mode [inline|off|promiscuous]

Examples
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#radio-share-mode promiscuous

Related Commands

no

Resets the radio share mode for this radio to its default
7.1.34.37 rate-selection

Sets the rate selection method to standard or opportunistic

Syntax

rate-selection [opportunistic|standard]

Parameters

- rate-selection [opportunistic|standard]

- standard
  - Configures the monotonic rate selection mode. This is the default setting.

- opportunistic
  - Configures the opportunistic radio link adaptation (ORLA) rate selection mode.

The ORLA algorithm is designed to select data rates that provide the best throughput. Instead of using local conditions to decide whether a data rate is acceptable or not, ORLA is designed to proactively probe other rates to determine if greater throughput is available. If these other rates do provide improved throughput, ORLA intelligently adjusts its selection tables to favour higher performance. ORLA provides improvements both on the client side of a mesh network as well as in the backhaul capabilities. ORLA is a key differentiator at the deployment and customer level and will be further explored in this paper.

Examples

nx9500-6C8809(config-profile-testAP71XX-if-radio1)#rate-selection opportunistic

nx9500-6C8809(config-profile-testAP71XX-if-radio1)#show context interface radio1
  rate-selection opportunistic

nx9500-6C8809(config-profile-testAP71XX-if-radio1)#

Related Commands

- no
  - Resets the rate selection mode to standard (monotonic)

NOTE: This feature is not supported on RFS4011 wireless controller.
7.1.34.4.38 rf-mode

interface-config-radio-instance

Configures the radio’s RF mode of operation

This command sets the mode to either 2.4 GHz WLAN or 5.0 GHz WLAN support depending on the radio’s intended client support. If you are currently licensed to use 4.9 GHz, configure the 4.9 GHz-WLAN option.

Set the mode to sensor if using the radio for rogue device detection. The radio cannot support rogue detection when one of the other radios is functioning as a WIPS sensor. To set a radio as a detector, disable sensor support on the other access point radios.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax
rf-mode [2.4GHz-wlan|4.9GHz-wlan|5GHz-wlan|bridge|scan-ahead|sensor]

Parameters
- rf-mode [2.4GHz-wlan|4.9GHz-wlan|5GHz-wlan|bridge|scan-ahead|sensor]

<table>
<thead>
<tr>
<th>rf-mode</th>
<th>Provides WLAN service in the 2.4 GHz bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4GHz-wlan</td>
<td>Provides WLAN service in the 2.4 GHz bandwidth</td>
</tr>
<tr>
<td>4.9GHz-wlan</td>
<td>Provides WLAN service in the 4.9 GHz bandwidth</td>
</tr>
<tr>
<td>5GHz-wlan</td>
<td>Provides WLAN service in the 5.0 GHz bandwidth</td>
</tr>
<tr>
<td>bridge</td>
<td>Enables this radio to operate as a bridge radio on 5.0 GHz bandwidth</td>
</tr>
</tbody>
</table>

Note: This option is applicable only on interface radio2 of the AP6522 and AP6562 model access points. Enable this option only if the access point is to provide client bridge radio support. Once enabled, configure the bridge parameters. For more information, see bridge.

<table>
<thead>
<tr>
<th>scan-ahead</th>
<th>Enables this radio to operate as a scan-ahead radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>A radio functioning in the scan-ahead mode is used for forward scanning only. The radio does not support WLAN or mesh services. The scan ahead feature is used in Dynamic Frequency Selection (DFS) aware countries for infrastructure devices, static, and vehicular mounted modems (VMMs). It enables a secondary radio to scan ahead for an active channel for backhaul transmission, in the event of a radar trigger on the primary radio. The device then switches radios allowing transmission to continue. This is required in environments where handoff is required and DFS triggers are common. With a secondary radio dedicated for forward scanning, the primary radio, in case of radar hit, hands over the channel availability check (CAC) function to the secondary radio. This avoids a break in data communication, which would have resulted if the primary radio was to do CAC itself. The secondary radio periodically does a scan of the configured channel list, searching for the other available meshpoint roots. When configured on the root meshpoint, the scan-ahead feature also scans for cleaner channels.</td>
<td></td>
</tr>
</tbody>
</table>

| sensor | Operates as a sensor radio. Configures this radio to function as a scanner, providing scanning services on both 2.4 GHz and 5.0 GHz bands. The radio does not provide WLAN services. |
Examples

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#rf-mode sensor

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  rf-mode sensor
  placement outdoor
  mesh client
  off-channel-scan channel-list 2.4GHz 1
  guard-interval long
  aggregation ampdu tx-only
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  non-unicast tx-rate bss 1 dynamic-all
  --More--

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)"
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Resets the radio’s RF mode of operation</td>
</tr>
<tr>
<td><strong>data-rates</strong></td>
<td>Configures the 802.11 data rates on this radio</td>
</tr>
</tbody>
</table>
7.1.34.4.39 rifs

`interface-config-radio-instance`

Configures Reduced Interframe Spacing (RIFS) parameters on this radio.

This value determines whether interframe spacing is applied to access point transmitted or received packets, both, or none. Inter-frame spacing is the interval between two consecutive Ethernet frames that enable a brief recovery between packets and allow target devices to prepare for the reception of the next packet.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7552, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

`rifs [none|rx-only|tx-only|tx-rx]`

Parameters

- `rifs [none|rx-only|tx-only|tx-rx]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>Disables support for RIFS. Consider setting the value to None for high-priority traffic to reduce packet delay.</td>
</tr>
<tr>
<td>rx-only</td>
<td>Supports RIFS possession only</td>
</tr>
<tr>
<td>tx-only</td>
<td>Supports RIFS transmission only</td>
</tr>
<tr>
<td>tx-rx</td>
<td>Supports both RIFS transmission and possession (default setting)</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#rifs tx-only
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
   rf-mode sensor
   placement outdoor
   mesh client
   off-channel-scan channel-list 2.4GHz 1
   guard-interval long
   aggregation ampdu tx-only
   rifs tx-only
   aeroscout forward
   ekahau forward ip 172.16.10.1 port 3
   non-unicast tx-rate bss 1 dynamic-all
   non-unicast tx-rate bss 2 highest-basic
   non-unicast tx-rate bss 3 highest-basic
   non-unicast tx-rate bss 4 highest-basic
   --More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

Related Commands

- `no` Disables radio’s RIFS parameters
7.1.34.40 rts-threshold

interface-config-radio-instance

Configures the Request to Send (RTS) threshold value on this radio

RTS is a transmitting station's signal that requests a Clear To Send (CTS) response from a receiving client. This RTS/CTS procedure clears the air where clients are contending for transmission time. Benefits include fewer data collisions and better communication with nodes that are hard to find (or hidden) because of other active nodes in the transmission path.

The RTS threshold controls RTS/CTS by initiating an RTS/CTS exchange for data frames larger than the threshold, and sends (without RTS/CTS) any data frames smaller than the threshold.

Consider the trade-offs when setting an appropriate RTS threshold for the WLAN's access point radios. A lower RTS threshold causes more frequent RTS/CTS exchanges. This consumes more bandwidth because of additional latency (RTS/CTS exchanges) before transmissions can commence. A disadvantage is the reduction in data-frame throughput. An advantage is quicker system recovery from electromagnetic interference and data collisions. Environments with more wireless traffic and contention for transmission make the best use of a lower RTS threshold.

A higher RTS threshold minimizes RTS/CTS exchanges, consuming less bandwidth for data transmissions. A disadvantage is less help to nodes that encounter interference and collisions. An advantage is faster data-frame throughput. Environments with less wireless traffic and contention for transmission make the best use of a higher RTS threshold.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

rts-threshold <0-65536>

Parameters

- rts-threshold <0-65536>

Examples

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#rts-threshold 100

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context

interface radiol
  rf-mode sensor
  placement outdoor
  mesh client
  rts-threshold 100
  off-channel-scan channel-list 2.4GHz 1
  guard-interval long
  aggregation ampdu tx-only
  rifs tx-only
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  non-unicast tx-rate bss 1 dynamic-all
  non-unicast tx-rate bss 2 highest-basic
  non-unicast tx-rate bss 3 highest-basic
  non-unicast tx-rate bss 4 highest-basic
  non-unicast tx-rate bss 5 highest-basic
  --More--

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands

no | Resets a radio's RTS threshold to its default
7.1.34.41 service

`interface-config-radio-instance`

Enables dynamic control function. This dynamic function controls performance of the radio receiver’s low noise amplifiers (LNAs).

When enabled, the control function, in the presence of very strong received signals, improves the receiver’s performance on radio 1. Strong signals are caused if the distance between the WiFi client and the AP is within two (2) meters. When disabled, the control function is a useful debug tool in case the uplink throughput is less than expected and the AP-to-client separation is greater than two (2) meters. Disabling the control function does not affect the receive sensitivity of the radio.

Supported in the following platforms:

- Access Points — AP622, AP6522, AP6562

Syntax

`service radio-lna [agc|ms]`

Parameters

- `service radio-lna [agc|ms]`

| service radio-lna [agc|ms] | Enables dynamic control function |
|---------------------------|----------------------------------|
|                           | • agc – Enables dynamic LNA control function. This is the default setting. |
|                           | • ms – Disables dynamic LNA control function |

Examples

`nx9500-6C8809(config-profile-testAP6522-if-radio1)#service radio-lna ms`

`nx9500-6C8809(config-profile-testAP6522-if-radio1)#show context
interface radio1
   service radio-lna ms`

`nx9500-6C8809(config-profile-testAP6522-if-radio1)#`

Related Commands

`no` | Reverts radio-lna mode to default (agc)
7.1.34.4.42 shutdown

Terminates or shuts down selected radio interface

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```
shutdown
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#shutdown
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Enables a disabled radio interface</td>
</tr>
</tbody>
</table>
7.1.34.43 smart-rf

interface-config-radio-instance

Overrides Smart RF channel width setting on this radio. When configured, the radio overrides the Smart RF selected channel setting and operates in the channel configured using this command.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax
smart-rf preferred-channel-width [20MHz|40MHz|80MHz]

Parameters
- smart-rf preferred-channel-width [20MHz|40MHz|80MHz]

Examples
nx9500-6C8809(config-profile-testAP71XX-if-radio1)#smart-rf preferred-channel-width 40MHz

nx9500-6C8809(config-profile-testAP71XX-if-radio1)#show context
interface radio1
  smart-rf preferred-channel-width 40MHz
  rate-selection opportunistic

nx9500-6C8809(config-profile-testAP71XX-if-radio1)#

Related Commands
- no Enables use of Smart RF selected channel of operation
7.1.34.44 sniffer-redirect

Captures and redirects packets to an IP address running a packet capture/analysis tool.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

sniffer-redirect [omnipeek|tzsp] <IP> channel [1|10|100|100w] {snap <1-65535> (append descriptor)}

Parameters

- sniffer-redirect [omnipeek|tzsp] <IP> channel [1|10|100|100w] {snap <1-65535> (append descriptor)}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sniffer-redirect</td>
<td>Captures and redirects packets to an IP address running a packet capture/analysis tool</td>
</tr>
<tr>
<td>omnipeek</td>
<td>Encapsulates captured packets in proprietary header (used with OmniPeek and plug-in)</td>
</tr>
<tr>
<td>tzsp</td>
<td>Encapsulates captured packets in TZSP (used with WireShark and other tools)</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>Specify the IP address of the device running the capture/analysis tool (the host to which captured off channel scan packets are redirected)</td>
</tr>
<tr>
<td>[1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>• 1 – Channel 1 in 20 MHz mode (default setting)</td>
</tr>
<tr>
<td></td>
<td>• 10 – Channel 10 in 20 MHz mode</td>
</tr>
<tr>
<td></td>
<td>• 100 – Channel 100 in 20 MHz mode</td>
</tr>
<tr>
<td></td>
<td>• 100w – Channels 100w in 40 MHz mode (channels 100*,104)</td>
</tr>
<tr>
<td>snap &lt;1-65535&gt;</td>
<td>Optional. Allows truncating of large captured frames at a specified length (in bytes). This option is useful when capturing traffic with large frames. Use this option when only headers are needed for analysis, since it reduces the bandwidth needed for sniffing, and (for typical values) eliminates any fragmentation of the outer packet.</td>
</tr>
<tr>
<td>append descriptor</td>
<td>Optional – Enables appending of the radio's receive descriptor to the captured packet</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-profile-71xxTestProfile-if-radiol)#sniffer-redirect omnipeek 172.16.10.1 channel 1

rfs7000-37FABE(config-profile-71xxTestProfile-if-radiol)#show context interface radiol
rf-mode sensor
placement outdoor
mesh client
rts-threshold 100
off-channel-scan channel-list 2.4GHz 1
guard-interval long
aggregation ampdu tx-only
rifs tx-only
sniffer-redirect omnipeek 172.16.10.1 channel 1
aeroscout forward
ekahau forward ip 172.16.10.1 port 3
non-unicast tx-rate bss 1 dynamic-all
non-unicast tx-rate bss 2 highest-basic
non-unicast tx-rate bss 3 highest-basic
non-unicast tx-rate bss 4 highest-basic
non-unicast tx-rate bss 5 highest-basic
non-unicast tx-rate bss 6 highest-basic

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables packet capture and redirection</td>
</tr>
</tbody>
</table>
7.1.34.45 stbc

*interface-config-radio-instance*

Configures the radio’s *Space Time Block Coding* (STBC) mode. STBC is a pre-transmission encoding scheme providing an improved SNR ratio (even at a single RF receiver). STBC transmits multiple data stream copies across multiple antennas. The receiver combines the copies into one to retrieve data from the signal. These transmitted data versions provide redundancy to increase the odds of receiving data streams with a good data decode (especially in noisy environments).

**NOTE:** STBC requires the radio has at least two antennas with the capability to transmit two streams. If the antenna mode is configured to 1x1 (or falls back to 1x1 for some reason), STBC support is automatically disabled.

---

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

`stbc [auto|none|tx-only]`

**Parameters**

- `stbc [auto|none|tx-only]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>stbc</td>
<td>Configures the radio’s STBC mode</td>
</tr>
<tr>
<td>auto</td>
<td>Autoselects STBC settings based on the platform type and other radio interface settings. This is the default setting.</td>
</tr>
<tr>
<td>none</td>
<td>Disables STBC support</td>
</tr>
<tr>
<td>tx-only</td>
<td>Configures the AP radio to format and broadcast the special stream (enables STBC support for transmit only)</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-81xxTestProfile-if-radio1)#stbc tx-only
rfs7000-37FABE(config-profile-81xxTestProfile-if-radio1)#show context
    interface radio1
    stbc tx-only
rfs7000-37FABE(config-profile-81xxTestProfile-if-radio1)#
```

**Related Commands**

- `no` Disables STBC support
7.1.34.4.46 transmit-beamforming

Enables transmit beamforming on this radio interface. This option is disabled by default.
When enabled, this option steers signals to peers in a specific direction to enhance signal strength and improve throughput amongst meshed devices (not clients). Each access point radio supports up to 16 beamforming capable mesh peers. When enabled, a beamformer steers its wireless signals to its peers. A beamformee device assists the beamformer with channel estimation by providing a feedback matrix. The feedback matrix is a set of values sent by the beamformee to assist the beamformer in computing a steering matrix. A steering matrix is an additional set of values used to steer wireless signals at the beamformer so constructive signals arrive at the beamformee for better SNR and throughput. Any beamforming capable mesh peer connecting to a radio whose capacity is exhausted cannot enable beamforming itself.

Supported in the following platforms:
- Access Points — AP8122, AP8132, AP8163

Syntax
transmit-beamforming

Parameters
None

Examples
nx9500-6C8809(config-profile-testAP81XX-if-radio1)#transmit-beamforming

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables transmit beamforming on this radio interface</td>
</tr>
</tbody>
</table>
7.1.34.47 use

Applies an association ACL policy and a radio QoS policy on this radio interface

An association ACL is a policy-based Access Control List (ACL) that either prevents or allows wireless clients from connecting to a controller managed access point radio. An ACL is a sequential collection of permit and deny conditions that apply to controller packets. When a packet is received on an interface, the controller compares the fields in the packet against any applied ACLs to verify the packet has the required permissions to be forwarded, based on the criteria specified in the access lists. If a packet does not meet any of the criteria specified in the ACL, the packet is dropped.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

Syntax

use [association-acl-policy|radio-qos-policy]

use [association-acl-policy <ASSOC-ACL-POLICY-NAME>|radio-qos-policy <RADIO-QoS-POLICY-NAME>]

Parameters

- use [association-acl-policy <ASSOC-ACL-POLICY-NAME>|radio-qos-policy <RADIO-QoS-POLICY-NAME>]

Examples

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#use association-acl-policy test

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context

interface radio
  rf-mode sensor
  placement outdoor
  mesh client
  rts-threshold 100
  off-channel-scan channel-list 2.4GHz 1
  guard-interval long
  aggregation ampdu tx-only
  rifs tx-only
  use association-acl-policy test
  sniffer-redirect omnipeek 172.16.10.1 channel 1
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  --More--

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands

no Dissociates the specified association ACL policy and radio QoS policy
7.1.34.48 wips

interface-config-radio-instance

Enables access point to change its channel of operation in order to terminate rogue devices. The radio should be configured to provide WLAN service.

This option is enabled by default.

Supported in the following platforms:

• Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533

• Wireless Controllers — RFS4011

NOTE: AP7522 and AP7532 access points use Smart RF to perform off-channel scans. Therefore, ensure that a Smart RF policy is configured and applied to AP7522 and AP7532 access points RF Domains to enable them perform rogue detection and termination.

Syntax

wips airtime-termination allow-channel-change

Parameters

• wips airtime-termination allow-channel-change

wips airtime-termination allow-channel-change | Enables access point to change its channel of operation (to that of the rogue device) in order to terminate the rogue device

Examples

nx9500-6C8809(config-profile-testAP81XX-if-radio1)#wips air-termination allow-channel-change

Related Commands

no | Disables access point to change its channel of operation in order to terminate rogue devices
7.1.34.49 wireless-client

- **interface-config-radio-instance**

Configures wireless client parameters on this radio

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

wireless-client tx-power [<0-20>|mode]

wireless-client <0-20>

wireless-client tx-power mode [802.11d {wing-ie}|wing-ie {802.11d}]

**Parameters**

- wireless-client tx-power <0-20>

- **wireless-client tx-power [802.11d {wing-ie}|wing-ie {802.11d}]**

**Examples**

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#wireless-client tx-power 20

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context

interface radio1
  rf-mode sensor
  placement outdoor
  mesh client
  rts-threshold 100
  **wireless-client tx-power 20**
  off-channel-scan channel-list 2.4GHz 1
  guard-interval long
  aggregation ampdu tx-only
  --More--

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

**Related Commands**

- **no**
  - Resets the transmit power indicated to wireless clients
### 7.1.34.4.50 wlan

**interface-config-radio-instance**

Enables a WLAN on this radio.

Use this command to configure WLAN/BSS mappings for an existing access point deployment. Administrators can assign each WLAN its own BSSID. If using a single-radio access point, there are 8 BSSIDs available. If using a dual-radio access point there are 8 BSSIDs for the 802.11b/g/n radio and 8 BSSIDs for the 802.11a/n radio.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4011

**Syntax**

```bash
wlan <WLAN-NAME> {bss|primary}
```

```bash
wlan <WLAN-NAME> {bss <1-16>} {primary}
```

**Parameters**

- `wlan <WLAN-NAME> {bss <1-16>} {primary}`

  - `<WLAN-NAME>`
  - `{bss <1-16> | primary}`

  Specify the WLAN name (it must have been already created and configured)

  - `bss <1-16>` — Optional. Specifies a BSS for the radio to map the WLAN
  - `<1-18>` — Specify the BSS number from 1 - 16.
  - `primary` — Optional. Uses the specified WLAN as the primary WLAN, when multiple WLANs exist on the BSS
  - `primary` — Optional. Uses the specified WLAN as the primary WLAN, when multiple WLANs exist on the BSS

**Examples**

```bash
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#wlan TestWLAN primary
```

```bash
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  rf-mode sensor
  placement outdoor
  mesh client
  rts-threshold 100
  wireless-client tx-power 20
  wlan TestWLAN bss 1 primary
  off-channel-scan channel-list 2.4GHz 1
  guard-interval long
  aggregation ampdu tx-only
  rifs tx-only
  use association-acl-policy test
  sniffer-redirect omnipeek 172.16.10.1 channel 1
  aeroscout forward
  ekahau forward ip 172.16.10.1 port 3
  non-unicast tx-rate bss 1 dynamic-all
  non-unicast tx-rate bss 2 highest-basic
  non-unicast tx-rate bss 3 highest-basic
  non-unicast tx-rate bss 4 highest-basic
  non-unicast tx-rate bss 5 highest-basic
  non-unicast tx-rate bss 6 highest-basic
  --More--
```

**Related Commands**

- `no` Disables a WLAN on a radio
7.1.34.5 interface-config-wwan-instance

A Wireless Wide Area Network (WWAN) card is a specialized network interface card that allows a network device to connect, transmit and receive data over a cellular WAN. AP7131 model access points, RFS4000 and RFS6000 controllers utilize a PCI express card slot that supports 3G WWAN cards. The WWAN card uses point-to-point protocol (PPP) to connect to the Internet Service Provider (ISP) and gain access to the Internet. PPP establishes internet links over dial-up modems, Digital Subscriber Line (DSL) connections, and many other types of point-to-point communications. PPP packages your system's TCP/IP packets and forwards them to the serial device where they can be put on the network. PPP is a full-duplex protocol used on various physical media, including twisted pair or fiber optic lines or satellite transmission. It uses a variation of High Speed Data Link Control (HDLC) for packet encapsulation.

To switch to the WWAN Interface configuration mode, use the following command:

```
<DEVICE>(config)#profile <DEVICE-TYPE> <DEVICE-PROFILE-NAME>
```

```
rfs4000-229D58(config)#profile rfs4000 testRFS4000
```

```
rfs4000-229D58(config-profile-testRFS4000)#
```

```
<DEVICE>(config-profile-<DEVICE-PROFILE-NAME>)#interface wwan1
```

```
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#?
```

Interface configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>apn</td>
<td>Configures the access point's name provided by the service provider</td>
<td>page 7-297</td>
</tr>
<tr>
<td>auth-type</td>
<td>Configures the authentication types used on this interface</td>
<td>page 7-298</td>
</tr>
<tr>
<td>crypto</td>
<td>Associates a crypto map with this interface</td>
<td>page 7-299</td>
</tr>
</tbody>
</table>

The following table summarizes WWAN interface configuration commands:

**Table 7.17 WWAN Interface Config Mode Commands**

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>apn</td>
<td></td>
<td>page 7-297</td>
</tr>
<tr>
<td>auth-type</td>
<td></td>
<td>page 7-298</td>
</tr>
<tr>
<td>crypto</td>
<td></td>
<td>page 7-299</td>
</tr>
</tbody>
</table>

**NOTE:** The WWAN interface is supported only on the AP7131, RFS4000, RFS6000 platforms.
### Table 7.17 WWAN Interface Config Mode Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip</td>
<td>Associates an IP ACL with this interface</td>
<td>page 7-300</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts the WWAN interface settings</td>
<td>page 7-301</td>
</tr>
<tr>
<td>password</td>
<td>Configures a password for this WWAN interface</td>
<td>page 7-302</td>
</tr>
<tr>
<td>use</td>
<td>Associates an IP ACL with this interface</td>
<td>page 7-304</td>
</tr>
<tr>
<td>username</td>
<td>Configures the names of users accessing this interface</td>
<td>page 7-305</td>
</tr>
</tbody>
</table>
7.1.34.5.1 apn

    interface-config-wwan-instance

Configures the cellular data provider’s name. This setting is needed in areas with multiple cellular data providers using the same protocols, such as Europe and Asia.

Supported in the following platforms:

- Access Points — AP7131
- Wireless Controllers — RFS4000, RFS6000

**Syntax**

apn <WORD>

**Parameters**

- apn <WORD>

<table>
<thead>
<tr>
<th>apn &lt;WORD&gt;</th>
<th>Specify the name of the cellular data service provider.</th>
</tr>
</thead>
</table>

**Examples**

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#apn AT&T

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#show context

    interface wwan1

    apn AT&T

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#

**Related Commands**

| no | Removes the configured access point name. |
7.1.34.5.2 auth-type

`interface-config-wwan-instance`

Configures the authentication type used by the cellular data provider

Supported in the following platforms:
- Access Points — AP7131
- Wireless Controllers — RFS4000, RFS6000

**Syntax**

`auth-type [chap|mschap|mschap-v2|pap]`

**Parameters**

- `auth-type [chap|mschap|mschap-v2|pap]`

<table>
<thead>
<tr>
<th>auth-type</th>
<th>Configures the authentication protocol used on this interface. The options are: PAP, CHAP, MSCHAP, and MSCHAP-v2</th>
</tr>
</thead>
<tbody>
<tr>
<td>chap</td>
<td>Configures Challenge-Handshake Authentication Protocol (CHAP). This is the default value.</td>
</tr>
<tr>
<td>mschap</td>
<td>Configures Microsoft Challenge-Handshake Authentication Protocol (MSCHAP)</td>
</tr>
<tr>
<td>mschapv2</td>
<td>Configures Microsoft Challenge-Handshake Authentication Protocol (MSCHAP) version 2</td>
</tr>
<tr>
<td>pap</td>
<td>Configures Password Authentication Protocol (PAP)</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#auth-type mschap-v2
```

```
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#show context
interface wwan1
   apn AT&T
   auth-type mschap-v2
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#
```

**Related Commands**

`no` Removes the authentication protocol configured on this interface
7.1.34.5.3 crypto

*interface-config-wwan-instance*

Associates a crypto map with this interface

Supported in the following platforms:

- Access Points — AP7131
- Wireless Controllers — RFS4000, RFS6000

**Syntax**

crypto map <CRYPTO-MAP-NAME>

**Parameters**

- crypto map <CRYPTO-MAP-NAME>

**Examples**

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#crypto map test

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#show context interface wwan1
   apn AT&T
   auth-type mschap-v2
   crypto map test

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#

**Related Commands**

**no**

Removes the crypto map associated with this interface
7.1.34.5.4 ip

*interface-config-wwan-instance*

Configures IP related settings on this interface

Supported in the following platforms:

- Access Points — AP7131
- Wireless Controllers — RFS4000, RFS6000

**Syntax**

```
ip [default-gateway|nat]
ip default-gateway priority <1-8000>
ip nat [inside|outside]
```

**Parameters**

- **ip default-gateway priority <1-8000>**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip</td>
<td>Configures IP related settings on this interface</td>
</tr>
<tr>
<td>default-gateway priority &lt;1-8000&gt;</td>
<td>Configures the default-gateway’s (learned by the wireless WAN) priority.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-8000&gt; – Specify a value from 1 - 8000. The default is 3000.</td>
</tr>
<tr>
<td>ip nat [inside</td>
<td>outside]</td>
</tr>
<tr>
<td>nat [inside</td>
<td>outside]</td>
</tr>
<tr>
<td></td>
<td>• inside – Marks this WWAN interface as NAT inside. The inside network is</td>
</tr>
<tr>
<td></td>
<td>transmitting data over the network to its intended destination. On the</td>
</tr>
<tr>
<td></td>
<td>way out, the source IP address is changed in the header and replaced by</td>
</tr>
<tr>
<td></td>
<td>the (public) IP address.</td>
</tr>
<tr>
<td></td>
<td>• outside – Marks this WWAN interface as NAT outside. Packets passing</td>
</tr>
<tr>
<td></td>
<td>through the NAT on the way back to the controller or service platform</td>
</tr>
<tr>
<td></td>
<td>managed LAN are matched against the records kept by the NAT engine.</td>
</tr>
<tr>
<td></td>
<td>There, the destination IP address is changed back to the specific internal</td>
</tr>
<tr>
<td></td>
<td>private class IP address in order to reach the LAN over the network.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#ip default-gateway priority 1
```

```
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#ip nat inside
```

```
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#show context
interface wwan1
  apn AT&T
  auth-type mschap-v2
  crypto map test
  ip nat inside
  ip default-gateway priority 1
```

**Related Commands**

```
no
```

Removes IP related settings on this interface
7.134.5.5 no

> interface-config-wwan-instance

Removes or reverts the WWAN interface settings

Supported in the following platforms:
- Access Points — AP7131
- Wireless Controllers — RFS4000, RFS6000

Syntax

no [all|apn|auth-type|crypto|description|ip|password|shutdown|use|username]

no [all|apn|auth-type|description|password|shutdown|username]

no crypto map

no ip [default-gateway priority|nat]

no use ip-access-list in

Parameters
- no <PARAMETERS>

Usage Guidelines

The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

Examples

The following example displays the WWAN interface settings before the ‘no’ commands are executed:

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#show context
interface wwan1
  apn AT&T
  auth-type mschap-v2
  crypto map test
  ip nat inside
  ip default-gateway priority 1

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#no apn

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#no auth-type

The following example displays the WWAN interface settings after the ‘no’ commands are executed:

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#show context
interface wwan1
  crypto map test
  ip nat inside
  ip default-gateway priority 1

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#
7.1.34.5.6 password

*interface-config-wwan-instance*

Configures a password for this WWAN interface. The configured value is used for authentication support by the cellular data carrier.

Supported in the following platforms:
- Access Points — AP71XX
- Wireless Controllers — RFS4000, RFS6000

**Syntax**

```
password [2 <WORD>|<WORD>]
```

**Parameters**

- `password [2 <WORD>|<WORD>]`

<table>
<thead>
<tr>
<th>password</th>
<th>Configures a password for this WWAN interface</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>2 &lt;WORD&gt;</code></td>
<td>Configures an encrypted password. Use this option when copy pasting the password from another device.</td>
</tr>
<tr>
<td><code>&lt;WORD&gt;</code></td>
<td>Enter the password string (should not exceed 32 characters in length.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#password 2 TechPubsTesting@123
```

```
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#show context
interface wwan1
  password TechPubsTesting@123
  crypto map test
  ip nat inside
  ip default-gateway priority 1
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#
```

**Related Commands**

```
no
```

Removes the configured password
7.1.34.5.7 shutdown

interface-config-wwan-instance

Shuts down this WWAN interface. Use the no > shutdown command to re-start the WWAN interface.

Supported in the following platforms:
- Access Points — AP71XX
- Wireless Controllers — RFS4000, RFS6000

Syntax

shutdown

Parameters

None

Examples

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#shutdown

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#show context
  interface wwan1
  shutdown

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#

Related Commands

no | Re-starts the WWAN interface
7.3.4.5.8 use

interface-config-wwan-instance

Associates an IP ACL with this interface. The ACL should be existing and configured.
The ACL applies an IP based firewall to all incoming packets. The ACL identifies a single IP or a range of IPs that are to be allowed or denied access on this interface.

Supported in the following platforms:

- Access Points — AP7131
- Wireless Controllers — RFS4000, RFS6000

Syntax

use ip-access-list in <ACCESS-LIST-NAME>

Parameters

- use ip-access-list in <ACCESS-LIST-NAME>

| use ip-access-list in <ACCESS-LIST-NAME> | Associates an inbound IPv4 ACL with this interface. This setting applies to IPv4 inbound traffic only and not IPv6 traffic. IPv4 operates as a best effort delivery method, as it does not guarantee delivery, and does not ensure proper sequencing or duplicate delivery (unlike TCP). IPv4 hosts can use link local addressing to provide local connectivity.
| <ACCESS-LIST-NAME> – Specify the IP ACL name. |

Examples

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#use ip-access-list in test

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#show context
interface wwan1
  password TechPubsTesting@123
  crypto map test
  ip nat inside
  use ip-access-list in test
  ip default-gateway priority 1
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#

Related Commands

no | Removes the IP ACL associated with this interface
7.1.34.5.9 username

**interface-config-wwan-instance**

Configures the names of users accessing this interface

Supported in the following platforms:

- Access Points — AP7131
- Wireless Controllers — RFS4000, RFS6000

**Syntax**

`username <WORD>`

**Parameters**

- `username <WORD>`

<table>
<thead>
<tr>
<th>username &lt;WORD&gt;</th>
<th>Configures the username for authentication support by the cellular data carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt; – Specify the username (should not exceed 32 characters).</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#username TechPubsUser1

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#show context
interface wwan1
  username TechPubsUser1
  password TechPubsTesting@123
  crypto map test
  ip nat inside
  use ip-access-list in test
  ip default-gateway priority 1

nx9500-6C8809(config-profile-testRFS6000-if-wwan1)#
```

**Related Commands**

- `no` Removes the configured username
7.1.34.6 interface-config-serial-instance

This section describes the serial interface configuration commands.

Use the (config-profile-<DEVICE-PROFILE-NAME>) instance to configure the serial interface associated with the service platform.

To switch to this mode, use the following command:

<DEVICE>(config-profile-<DEVICE-PROFILE-NAME>)#interface ?

The following example uses the config-profile-default-nx45xx instance to configure a serial interface:

nx4500-5CFA2B(config-profile-default-nx45xx)#interface?

WORD          Interface name
fe            Select a FastEthernet interface
ge            Select a GigabitEthernet interface
mel           Select the management interface
port-channel  Select a port channel interface
pppoel        Select the PPP Over Ethernet interface
radio         Select a radios
serial        Select a serial interface (virtual interface)
tel           Select a T1 or E1 interface
up            Select the Uplink GigabitEthernet interface
vlan          Select a vlan interface (switched virtual interface)
vml           Select the virtual interface
wwan1         Select the wireless wan interface
xge           Select a TenGigabitEthernet interface

nx4500-5CFA2B(config-profile-default-nx45xx)#interface

nx4500-5CFA2B(config-profile-default-nx45xx)#interface serial-<1-4>/1:1

nx4500-5CFA2B(config-profile-default-nx45xx)#interface serial-<1-4>/1:1

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#?

Interface configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>authentication</td>
<td>Type of authentication, Eg chap, pap</td>
</tr>
<tr>
<td>description</td>
<td>Enter description provided by the service provider</td>
</tr>
<tr>
<td>encapsulation</td>
<td>The type of traffic that this group handles.</td>
</tr>
<tr>
<td>ip</td>
<td>Internet Protocol (IP)</td>
</tr>
<tr>
<td>local-ip-address</td>
<td>IP address assigned to the local system</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>password</td>
<td>Enter password provided by the service provider</td>
</tr>
<tr>
<td>remote-ip-subnet</td>
<td>IP subnet assigned to the remote system along with subnet in CIDR notation</td>
</tr>
<tr>
<td>remove-override</td>
<td>Remove override from the device</td>
</tr>
<tr>
<td>shutdown</td>
<td>Disable serial interface</td>
</tr>
<tr>
<td>use</td>
<td>Set setting to use</td>
</tr>
<tr>
<td>username</td>
<td>Enter username provided by the service provider</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
</tr>
</tbody>
</table>

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#
The following table summarizes serial interface configuration commands:

**Table 7.18 Serial Interface Config Mode Commands**

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>authentication</td>
<td>Configures the authentication type used on the serial interface</td>
<td>page 7-308</td>
</tr>
<tr>
<td>description</td>
<td>Configures a description of the serial interface</td>
<td>page 7-309</td>
</tr>
<tr>
<td>encapsulation</td>
<td>Defines the type of traffic handled by the serial interface</td>
<td>page 7-310</td>
</tr>
<tr>
<td>ip</td>
<td>Configures serial interface IP to use NAT</td>
<td>page 7-311</td>
</tr>
<tr>
<td>local-ip-address</td>
<td>Assigns a local IP address for this serial interface</td>
<td>page 7-312</td>
</tr>
<tr>
<td>no</td>
<td>Disables or reverts serial interface settings to their defaults</td>
<td>page 7-313</td>
</tr>
<tr>
<td>password</td>
<td>Configures the serial interface's password</td>
<td>page 7-314</td>
</tr>
<tr>
<td>remote-ip-subnet</td>
<td>Configures the remote system's IP address and subnet</td>
<td>page 7-315</td>
</tr>
<tr>
<td>remove-override</td>
<td>Removes device overrides</td>
<td>page 7-316</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down the serial interface</td>
<td>page 7-318</td>
</tr>
<tr>
<td>use</td>
<td>Applies an IP access list on this serial interface</td>
<td>page 7-319</td>
</tr>
<tr>
<td>username</td>
<td>Configures the serial interface's user names</td>
<td>page 7-320</td>
</tr>
</tbody>
</table>
## 7.1.34.6.1 authentication

*interface-config-serial-instance*

Configures the type of authentication used for this serial interface.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524

### Syntax

```
authentication [chap|none|pap]
```

### Parameters

- `authentication [chap|none|pap]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>chap</td>
<td>Configures the authentication mode as CHAP</td>
</tr>
<tr>
<td>none</td>
<td>Configures no authentication mode</td>
</tr>
<tr>
<td>pap</td>
<td>Configures the authentication mode as PAP</td>
</tr>
</tbody>
</table>

### Examples

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#authentication pap
```

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context
interface serial-1/1:1
  authentication pap
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables or reverts serial interface settings to their default</td>
</tr>
</tbody>
</table>
7.1.34.6.2 description

Configures a string that describes the serial interface (supplied by the service provider).

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

description <WORD>

**Parameters**
- description <WORD>

<table>
<thead>
<tr>
<th>description &lt;WORD&gt;</th>
<th>Configures the serial interface's description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt;</td>
<td>- &lt;WORD&gt; — Provide a unique description for this serial interface (should not exceed 32 characters in length)</td>
</tr>
</tbody>
</table>

**Examples**

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#description "This interface is for the Sales Team"

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context
interface serial-1/1:1
  authentication pap
description "This interface is for the Sales Team"

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#

**Related Commands**

no
Removes the serial interface’s description
### 7.1.34.6.3 encapsulation

`interface-config-serial-instance`

**Defines the data encapsulation protocol used on this serial interface**

**Supported in the following platforms:**
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

```
encapsulation [chdlc|ppp]
```

**Parameters**

- `encapsulation [chdlc|ppp]`

| encapsulation [chdlc|ppp] | Configures the data encapsulation protocol used |
|---------------------------|-----------------------------------------------|
| chdlc                     | Configures the encapsulation type as *Cisco High-Level Data Link Control* (CHDLC). CHDLC is a CISCO proprietary protocol that uses HDLC to send data over synchronous serial links. |
| ppp                       | Configures the encapsulation type as *Point-to-Point Protocol* (PPP) |

**Examples**

```plaintext
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#encapsulation chdlc

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context
interface serial-1/1:1
  encapsulation chdlc
  authentication pap
  description "This interface is for the Sales Team"
```

**Related Commands**

- `no` Disables or reverts serial interface settings to their default
7.1.34.6.4 ip

- interface-config-serial-instance

Configures serial interface IP to use NAT. NAT allows for multiple devices on a LAN with private IP addresses to share a single public IP address.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax
ip nat [inside|outside]

Parameters
- ip nat [inside|outside]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip nat</td>
<td>Enables the use of NAT on this serial interface</td>
</tr>
<tr>
<td>inside</td>
<td>Marks this serial interface as NAT inside interface</td>
</tr>
<tr>
<td>outside</td>
<td>Marks this serial interface as NAT outside interface</td>
</tr>
</tbody>
</table>

Examples
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#ip nat inside

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context interface serial-1/1:1
encapsulation chdlc
authentication pap
ip nat inside
description "This interface is for the Sales Team"
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#

Related Commands
- no Disables or reverts serial interface settings to their default
7.1.34.6.5 local-ip-address

Assigns a local IP address for this serial interface

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

`local-ip-address <IP>`

**Parameters**

- `local-ip-address <IP>`

<table>
<thead>
<tr>
<th>local-ip-address &lt;IP&gt;</th>
<th>Specify the IP address in the A.B.C.D format</th>
</tr>
</thead>
</table>

**Examples**

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#local-ip-address 192.168.13.7
```

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context interface serial-1/1:1
  encapsulation chdlc
  authentication pap
  **local-ip-address 192.168.13.7**
  ip nat inside
description "This interface is for the Sales Team"
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#
```

**Related Commands**

- `no` Disables or reverts serial interface settings to their default
7.1.34.6.6 no

interface-config-serial-instance

Removes or resets this serial interface’s settings

Supported in the following platforms:
  • Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

no [authentication|description|ip|local-ip-address|password|remote-ip-address|
  shutdown|use|username]

no [authentication|description|local-ip-address|password|remote-ip-address|shutdown|
  username]

no ip nat

no use ip-access-list in

Parameters

- no <PARAMETERS>

no <PARAMETERS> Removes or reverts this serial interface’s settings based on the parameters passed

Usage Guidelines

The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

Examples

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#no ?
  authentication    Type of authentication. Eg chap, pap
  description       Delete the description of this interface
  ip                Internet Protocol (IP)
  local-ip-address  IP address assigned to the local system
  password          Enter password provided by the service provider
  remote-ip-subnet  IP subnet assigned to the remote system along with subnet in CIDR notation
  shutdown          Enable serial interface
  use                Set setting to use
  username          Enter username provided by the service provider

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#
7.1.34.6.7 password

`interface-config-serial-instance`

Configures the serial interface's password (supplied by the service provider)

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

```
password <WORD>
```

**Parameters**

- `password <WORD>`

**Examples**

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#password testing@1234
```

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context
interface serial-1/1:1
  encapsulation chdlc
  authentication pap
password testing@1234
  local-ip-address 192.168.13.7
  ip nat inside
  description "This interface is for the Sales Team"
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#
```

**Related Commands**

- `no`
  Disables or reverts serial interface settings to their default
### 7.1.34.6.8 `remote-ip-subnet`

**interface-config-serial-instance**

Configures the remote system’s IP address and subnet in the *classes inter-domain routing* (CIDR) format.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

`remote-ip-subnet <IP/M>`

**Parameters**

- `remote-ip-subnet <IP/M>`

<table>
<thead>
<tr>
<th><code>remote-ip-subnet &lt;IP/M&gt;</code></th>
<th>Defines a IP subnet assigned to the remote system along with subnet. Specify the IP address and subnet value in the A.B.C.D/M format.</th>
</tr>
</thead>
</table>

**Examples**

```bash
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#remote-ip-subnet 192.168.0.10/24

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context
   interface serial-1/1:1
     encapsulation chdlc
     authentication pap
     password testing@1234
     local-ip-address 192.168.13.7
     remote-ip-subnet 192.168.13.10/24
     ip nat inside
     description "This interface is for the Sales Team"

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#
```

**Related Commands**

- `no` Disables or reverts serial interface settings to their default
7.1.34.6.9 remove-override

*interface-config-serial-instance*

Removes device overrides and applies the profile-level setting based on the parameters passed.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

```plaintext
remove-override [authentication|description|encapsulation|ip|local-ip-address|
password|remote-ip-subnet|shutdown|use|username]
remove-override [authentication|description|encapsulation|local-ip-address|
password|remote-ip-subnet|shutdown|username]
remove-override ip nat
remove-override use ip-access-list in
```

**Parameters**
- `remove-override <PARAMETERS>`

<table>
<thead>
<tr>
<th>remove-override &lt;PARAMETERS&gt;</th>
<th>Removes serial interface related overrides applied on the device to enable profile settings to take effect</th>
</tr>
</thead>
</table>

**Examples**

```plaintext
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#remove-override ?
authentication Remove override for authentication
description Remove override for description
encapsulation Remove override for encapsulation
ip Remove override for Internet Protocol (IP)
local-ip-address Remove override for local-ip-address
password Remove override for password
remote-ip-subnet Remove override for remote-ip-subnet
shutdown Remove override for serial interface
use Set setting to use
username Remove override for username
```

```plaintext
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context
interface serial-1/1:1
encapsulation chdlc
authentication pap
password testing@1234
local-ip-address 192.168.13.7
remote-ip-subnet 192.168.13.10/24
ip nat inside
description "This interface is for the Sales Team"
```

```plaintext
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#remove-override encapsulation
```

```plaintext
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context
interface serial-1/1:1
authentication pap
password testing@1234
local-ip-address 192.168.13.7
remote-ip-subnet 192.168.13.10/24
ip nat inside
description "This interface is for the Sales Team"
```

```plaintext
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#
```
<table>
<thead>
<tr>
<th>Related Commands</th>
<th>Describes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables or reverts serial interface settings to their default</td>
</tr>
</tbody>
</table>
## 7.1.34.6.10 shutdown

Shuts down the serial interface. Use the no shutdown command to re-start a serial interface.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

### Syntax

```
shutdown
```

### Parameters

None

### Examples

```
nx4500-5CFA2B(config-profile-default-nx6500-if-serial-1/1:1)#shutdown
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables or reverts serial interface settings to their default</td>
</tr>
</tbody>
</table>
### 7.1.34.6.11 use

**interface-config-serial-instance**

Applies an IP access list on this serial interface

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

use ip-access-list in <IP-ACCESS-LIST-NAME>

**Parameters**

- use ip-access-list in <IP-ACCESS-LIST-NAME>

---

<table>
<thead>
<tr>
<th>use ip-access-list in &lt;IP-ACCESS-LIST-NAME&gt;</th>
<th>Applies an IP access list on this serial interface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• in — Applies the IP ACL on incoming packets</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP-ACCESS-LIST-NAME&gt; — Specify the IP access list name (it should be an existing and configured).</td>
</tr>
</tbody>
</table>

**Examples**

```bash
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#use ip-access-list in BROADCAST-MULTICAST-CONTROL

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context
interface serial-1/1:1
    authentication pap
    password testing@1234
    local-ip-address 192.168.13.7
    remote-ip-subnet 192.168.13.10/24
    ip nat inside
    use ip-access-list in BROADCAST-MULTICAST-CONTROL
    description "This interface is for the Sales Team"
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#
```

**Related Commands**

- no: Disables or reverts serial interface settings to their default
7.1.34.6.12 username

`interface-config-serial-instance`

Configures the names of users accessing this serial interface (provided by the service provider)

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

`username <WORD>`

**Parameters**

- **username <WORD>**

**Examples**

```
nx4500-5CFA2B(config-profile-default-nx6500-if-serial-1/1:1)#username SalesPerson1

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#show context
interface serial-1/1:1
  authentication pap
  username SalesPerson1
  password testing@1234
  local-ip-address 192.168.13.7
  remote-ip-subnet 192.168.13.10/24
  ip nat inside
  use ip-access-list in BROADCAST-MULTICAST-CONTROL
  description "This interface is for the Sales Team"
```

**Related Commands**

- `no` Disables or reverts serial interface settings to their default
### 7.1.34.7 interface-config-t1e1-instance

**interface**

The T1/E1 interfaces are physical layer interfaces that support data, voice, or a combination of data and voice applications.

Use the (config-profile-<DEVICE-PROFILE-NAME>) instance to configure the T1E1 interface associated with the service platform.

To switch to this mode, use the following command:

```
<DEVICE>(config)#profile <DEVICE-TYPE> <DEVICE-PROFILE-NAME>
<DEVICE>(config-profile-<DEVICE-PROFILE-NAME>)#interface ?
```

The following example uses the config-profile-default-nx65xx instance to configure a T1E1 interface:

```
nx6500-31FABE(config-profile-default-nx6500)#interface t1e1 1 1
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```

```
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#?
```

**Interface Configuration commands:**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-group</td>
<td>Creates a channel group and assigns an index number</td>
<td>page 7-323</td>
</tr>
<tr>
<td>clock-mode</td>
<td>Configures the selected T1E1 interface’s clock mode</td>
<td>page 7-324</td>
</tr>
<tr>
<td>description</td>
<td>Configures the selected T1E1 interface’s description</td>
<td>page 7-325</td>
</tr>
<tr>
<td>high-impedance</td>
<td>Enables high-impedance monitoring on the selected T1E1 interface</td>
<td>page 7-326</td>
</tr>
<tr>
<td>line-build-out</td>
<td>Defines the line build out in decibels (dB), ohms (OH), or feet (ft)</td>
<td>page 7-327</td>
</tr>
<tr>
<td>line-encoding</td>
<td>Configures the selected T1E1 interface’s encoding type</td>
<td>page 7-328</td>
</tr>
<tr>
<td>media</td>
<td>Configures the media type for the physical interface</td>
<td>page 7-329</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts T1E1 interface settings to default</td>
<td>page 7-330</td>
</tr>
<tr>
<td>remove-override</td>
<td>Removes device overrides on the selected T1E1 interface</td>
<td>page 7-331</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
<td></td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
<td></td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
<td></td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
<td></td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
<td></td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
<td></td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
<td></td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
<td></td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
<td></td>
</tr>
</tbody>
</table>

The following table summarizes T1E1 interface configuration commands:

#### Table 7.19 T1E1 Interface Config Mode Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-group</td>
<td>Creates a channel group and assigns an index number</td>
<td>page 7-323</td>
</tr>
<tr>
<td>clock-mode</td>
<td>Configures the selected T1E1 interface’s clock mode</td>
<td>page 7-324</td>
</tr>
<tr>
<td>description</td>
<td>Configures the selected T1E1 interface’s description</td>
<td>page 7-325</td>
</tr>
<tr>
<td>high-impedance</td>
<td>Enables high-impedance monitoring on the selected T1E1 interface</td>
<td>page 7-326</td>
</tr>
<tr>
<td>line-build-out</td>
<td>Defines the line build out in decibels (dB), ohms (OH), or feet (ft)</td>
<td>page 7-327</td>
</tr>
<tr>
<td>line-encoding</td>
<td>Configures the selected T1E1 interface’s encoding type</td>
<td>page 7-328</td>
</tr>
<tr>
<td>media</td>
<td>Configures the media type for the physical interface</td>
<td>page 7-329</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts T1E1 interface settings to default</td>
<td>page 7-330</td>
</tr>
<tr>
<td>remove-override</td>
<td>Removes device overrides on the selected T1E1 interface</td>
<td>page 7-331</td>
</tr>
</tbody>
</table>
Table 7.19  T1E1 Interface Config Mode Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>rx-sensitivity-level</td>
<td>Configures the receive sensitivity level in decibels (dB)</td>
<td>page 7-332</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down the selected T1E1 interface</td>
<td>page 7-333</td>
</tr>
</tbody>
</table>
7.1.34.7.1 channel-group

interface-config-t1e1-instance

Creates a channel group on the selected interface. Channel groups are created to provide WAN data services. Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

channel-group <1-1> timeslots [<TIMESLOT-LIST>|all]

Parameters

- channel-group <1-1> timeslots [<TIMESLOT-LIST>|all]

<table>
<thead>
<tr>
<th>channel-group &lt;1-1&gt;</th>
<th>Specify the channel group index</th>
</tr>
</thead>
<tbody>
<tr>
<td>timeslots [&lt;TIMESLOT-LIST&gt;</td>
<td>all]</td>
</tr>
<tr>
<td>• &lt;TIMESLOT-LIST&gt; – Specifies a list of timeslot IDs in the following format: 10-20, 25, 30-31</td>
<td></td>
</tr>
<tr>
<td>• all – Configures all timeslots for the specified channel group</td>
<td></td>
</tr>
</tbody>
</table>

Examples

nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#channel-group 1 timeslots all

nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#show context

interface t1e1-1/1
channel-group 1 timeslots all

nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#

Related Commands

no | Removes the channel group configured on the T1E1 interface |
7.1.34.7.2 clock-mode

Configures the mode for the clock on the selected T1E1 interface. A synchronized clock mode ensures smooth clock extraction and data transfer.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

```
clock-mode [master|normal]
```

Parameters

- `clock-mode [master|normal]`

Examples

```
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#clock-mode master

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B-if-t1e1-1/1)#show context
    interface t1e1-1/1
    clock-mode master
    channel-group 1 timeslots all

nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#
```

Related Commands

- `no`
  - Reverts the T1E1 interface clock mode to default (normal)
### 7.1.34.7.3 description

**interface-config-t1e1-instance**

Configures the selected T1E1 interface’s description

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

description <LINE>

**Parameters**
- description <LINE>

| description <LINE> | Provide a unique description for this T1E1 interface. The description should not exceed 64 characters in length and should help identify the interface. |

**Examples**

nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#description "t1 interface slot 1 Main Office"

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B-if-t1e1-1/1)#show context interface t1e1-1/1
clock-mode master
channel-group 1 timeslots all
description "t1 interface slot 1 Main Office"
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#

**Related Commands**

| no | Removes or resets the T1E1 interface description |
7.1.34.7.4 high-impedance

Enables high impedance monitoring on the selected T1E1 interface. High impedance interfaces imply low current and high voltage.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax
high-impedance [disable|enable]

Parameters
- high-impedance [disable|enable]

| high-impedance [disable|enable] | Enables or disables high-impedance |
|---------------------------------|-----------------------------------|
|                                 | • disable – Disables high-impedance |
|                                 | • enable – Enables high-impedance |

Examples
nx4500-5CFA2B(config-profile-testNX45XX-if-tle1-1/1)#high-impedance enable

nx4500-5CFA2B(config-profile-testNX45XX-if-tle1-1/1)#show context
interface tle1-1/1
clock-mode master
  high-impedance enable
  channel-group 1 timeslots all
description "t1 interface slot 1 Main Office"

nx4500-5CFA2B(config-profile-testNX45XX-if-tle1-1/1)#

Related Commands

| no | Resets the high impedance setting to either enable or disable |
### 7.1.34.7.5 line-build-out

*interface-config-t1e1-instance*

Defines the line build out in decibels (dB), ohms (OH), or feet (ft). This command specifies the distance to the next repeater.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

```plaintext
line-build-out [dB|OH|ft]
line-build-out [0-110ft|0dB|110-120ft|120OH|15dB|22.5dB|220-330ft|330-440ft|440-550ft|550-660ft|7.5dB|75OH]
```

**Parameters**

- `line-build-out [0-110ft|0dB|110-220ft|120OH|15dB|22.5dB|220-330ft|330-440ft|440-550ft|550-660ft|7.5dB|75OH]`

| line-build-out [dB|OH|ft] | Defines the line build out in decibels (dB), ohms (OH), or feet (ft) |
|------------------------|---------------------------------------------------------------|
| 0-110ft                | 0-110 feet (0-33 meters)                                      |
| 0dB                    | 0 decibels                                                   |
| 110-220ft              | 110-220 feet (33-67 meters)                                   |
| 120OH                  | 120 ohms default for E1                                       |
| 15dB                   | 15 decibels                                                  |
| 22.5dB                 | 22.5 decibels                                                |
| 220-330ft              | 220-330 feet (67-100 meters)                                  |
| 330-440ft              | 330-440 feet (100-133 meters)                                 |
| 440-550ft              | 440-550 feet (133-167 meters)                                 |
| 550-660ft              | 0-110 feet (167-200 meters)                                   |
| 7.5dB                  | 7.5 decibels                                                  |
| 75OH                   | 75 ohms alternate for E1                                      |

The valid line-build-out values for media t1 are: 0dB, 7.5dB, 15dB, 22.5dB, 0-110ft, 110-220ft, 220-330ft, 330-440ft, 440-550ft, and 550-660ft. Recommended default is 0dB.

**Examples**

```plaintext
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#line-build-out 120OH

nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#show context
interface t1e1-1/1
  clock-mode master
  line-build-out 120OH
  high-impedance enable
  channel-group 1 timeslots all
  description "t1 interface slot 1 Main Office"

nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#
```

**Related Commands**

- `no` resets the T1E1 interface line-build-out setting.
7.1.34.7.6 line-encoding

*interface-config-t1e1-instance*

Configures the line encoding type on the selected T1E1 interface

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

line-encoding [ami|b8zs]

**Parameters**

- line-encoding [ami|b8zs]

| line-encoding [ami|b8zs] | Sets the line encoding type (designated by the service provider). The options are ami and b8zs  
|-------------------------|---------------------------------------------------------------------------------------------------|
|                         | • ami – Configures encoding type as *Alternate Mark Inversion* (ami). This option is commonly used for the E1 interfaces.  
|                         | • b8zs – Configures the encoding type as *Bipolar 8-Zero Substitution* (b8zs). This option is commonly used for T1 interfaces. |

**Examples**

```
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#line-encoding ami

nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#show context
  interface t1e1-1/1
  clock-mode master
  line-encoding ami
  line-build-out 120OH
  high-impedance enable
  channel-group 1 timeslots all
  description "t1 interface slot 1 Main Office"
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#
```

**Related Commands**

| no | Resets the T1E1 interface line-encoding setting |
7.1.34.7.7 media

*interface-config-t1e1-instance*

Configures the media type for the physical interface

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

```
media [e1|t1]
```

**Parameters**
- `media [e1|t1]`

| media [e1|t1] | Sets the media type for the physical interface. The options are: e1 and t1. |
|---------------|--------------------------------------------------------------------------------|
|               | • e1 – E1 (common for Europe and worldwide) |
|               | • t1 – T1 (common for USA and Canada) |
|               | If high-impedance is set to 'enable', and media |

**Examples**

```
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#media t1

nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#show context
interface t1e1-1/1
  clock-mode master
  line-encoding ami
  line-build-out 1200H
  high-impedance enable
  channel-group 1 timeslots all
  media t1
  description "t1 interface slot 1 Main Office"
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#
```

**Related Commands**

| no | Resets the T1E1 interface media type setting |
7.1.34.7.8 no

Negates or reverts settings to default

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

no [channel-group|clock-mode|description|high-impedance|line-encoding|media|shutdown]

Parameters

- no <PARAMETERS>

no <PARAMETERS> Removes or reverts this t1e1 interface’s settings based on the parameters passed

Examples

The following example displays the t1e1 interface settings before the ‘no’ commands are executed:

```
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#show context
interface t1e1-1/1
  clock-mode master
  line-encoding ami
  line-build-out 1200H
  high-impedance enable
  rx-sensitivity-level 30dB
  channel-group 1 timeslots all
  media t1
  description "t1 interface slot 1 Main Office"
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#
```

```
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#no channel-group 1
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#no high-impedance
```

The following example displays the t1e1 interface settings after the ‘no’ commands are executed:

```
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#show context
interface t1e1-1/1
  clock-mode master
  line-encoding ami
  line-build-out 1200H
  high-impedance disable
  rx-sensitivity-level 30dB
  media t1
  description "t1 interface slot 1 Main Office"
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#
```
7.1.34.7.9 remove-override

Remove device overrides on the selected T1E1 interface

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

```
remove-override [channel-group|clock-mode|description|high-impedance|line-build-out|
line-encoding|media|shutdown]
```

Parameters

- `remove-override <PARAMETERS>`

<table>
<thead>
<tr>
<th>remove-override</th>
<th>Removes device-level overrides based on the parameters passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;PARAMETERS&gt;</td>
<td></td>
</tr>
</tbody>
</table>

Examples

```
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#remove-override ?
channel-group   Channel-group for this interface
description     Delete the description of this interface
high-impedance Delete high-impedance
line-encoding  Delete line-encoding
media          Delete media
shutdown       Enable t1 interface
```

```
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#
```
7.1.34.7.10 rx-sensitivity-level

Configures the receive sensitivity level, in decibels (dB), on the selected T1E1 interface.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

```
rx-sensitivity-level [0dB|12dB|18dB|30dB|36dB|43dB]
```

Parameters

- `rx-sensitivity-level` [0dB|12dB|18dB|30dB|36dB|43dB]

| rx-sensitivity-level [0dB|12dB|18dB|30dB|36dB|43dB] | Sets the receive sensitivity level in decibels (dB) |
|-------------------------------------------------------------|-------------------------------------------------|
| 0dB — 0 decibels                                            |                                                |
| 12dB — 12 decibels                                          |                                                |
| 17.5dB — 17.5 decibels                                      |                                                |
| 18dB — 18 decibels                                          |                                                |
| 22.5dB — 22.5 decibels                                      |                                                |
| 30dB — 30 decibels                                          |                                                |
| 36dB — 36 decibels                                          |                                                |
| 43dB — 43 decibels                                          |                                                |

If high-impedance is set to ‘enable’, and media is set to either ‘t1’ or ‘e1’, the valid `rx-sensitivity-level` values are: 30dB and 12dB. The recommended value is 30dB.

Examples

```
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#rx-sensitivity-level 30dB
```

```
nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B-if-t1e1-1/1)#show context
interface t1e1-1/1
clock-mode master
line-encoding ami
line-build-out 1200H
high-impedance enable
rx-sensitivity-level 30dB
channel-group 1 timeslots all
media t1
description "t1 interface slot 1 Main Office"
nx4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#
```

Related Commands

| `no` | Removes or resets rx sensitivity settings |
7.1.34.7.11 shutdown

Shuts down the selected T1E1 interface. Use the `no shutdown` command to re-start the interface.

- **Supported in the following platforms:**
  - Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**
```
shutdown
```

**Parameters**

None

**Examples**
```
x4500-5CFA2B(config-profile-testNX45XX-if-t1e1-1/1)#shutdown
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Re-starts the T1E1 interface</td>
</tr>
</tbody>
</table>
WiNG provides a dataplane bridge for external network connectivity for Virtual Machines (VMs). VM interfaces are layer 2 interfaces on WiNG bridge that define which IP address is associated with each VLAN ID the service platform is connected to and enables remote service platform administration. Each custom VM can have up to a maximum of two physical VM interfaces. Each VM interface can be mapped to one of eight VMIF ports for and NX4500 and NX6500 service platforms and twelve ports for NX9500 on the dataplane bridge. This mapping determines the destination for service platform routing.

By default, VM interfaces are internally connected to the dataplane bridge via VMIF1. VMIF1 is an untagged port providing access to VLAN 1 to support the capability to connect the VM interfaces to any of the VMIF ports. This provides the flexibility to move a VM interface onto different VLANs as well as configure specific firewall and QoS rules.

Use the (config-profile-<DEVICE-PROFILE-NAME>) instance to configure the VM interface associated with the service platform profile.

To switch to this mode, use the following commands:

```
<DEVICE>(config)#profile <DEVICE-TYPE> <DEVICE-PROFILE-NAME>
<DEVICE>(config-profile-<DEVICE-PROFILE-NAME>)#interface ?
```

The following example uses the config-profile-default-nx45xx instance to configure a VM interface:

```
nx4500-5CFA2B(config-profile-default-nx45xx)#interface vmif ?
<1-8> Interface index

nx4500-5CFA2B(config-profile-default-nx45xx)#interface vmif 2

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#?
```

VM Interface Mode commands:
- **description**: Port description
- **ip**: Internet Protocol (IP)
- **ipv6**: Internet Protocol version 6 (IPv6)
- **no**: Negate a command or set its defaults
- **qos**: Quality of service
- **switchport**: Set switching mode characteristics
- **use**: Set setting to use
- **clrscr**: Clears the display screen
- **commit**: Commit all changes made in this session
- **do**: Run commands from Exec mode
- **end**: End current mode and change to EXEC mode
- **exit**: End current mode and down to previous mode
- **help**: Description of the interactive help system
- **revert**: Revert changes
- **service**: Service Commands
- **show**: Show running system information
- **write**: Write running configuration to memory or terminal

```
nx9500-6C8809(config-profile-default-nx9000)#interface vmif ?
<1-12> Interface index
```
**nx9500-6C8809(config-profile-default-nx9000)#interface vmif 2**

**nx9500-6C8809(config-profile-default-nx9000-if-vmif2)#?**

**VM Interface Mode commands:**
- `description` - Port description
- `ip` - Internet Protocol (IP)
- `ipv6` - Internet Protocol version 6 (IPv6)
- `no` - Negate a command or set its defaults
- `qos` - Quality of service
- `switchport` - Set switching mode characteristics
- `use` - Set setting to use
- `commit` - Commit all changes made in this session
- `end` - End current mode and change to EXEC mode
- `exit` - End current mode and down to previous mode
- `revert` - Revert changes
- `write` - Write running configuration to memory or terminal

**nx9500-6C8809(config-profile-default-nx9000-if-vmif2)#**

The following table summarizes VM interface configuration commands:

### Table 7.20  VM Interface Config Commands

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<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
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<td><code>description</code></td>
<td>Configures a short description of this VM interface</td>
<td>page 7-336</td>
</tr>
<tr>
<td><code>ip</code></td>
<td>Configures settings related to ARP and DHCP responses</td>
<td>page 7-337</td>
</tr>
<tr>
<td><code>ipv6</code></td>
<td>Configures the DHCPv6 and ICMPv6 neighbor discovery (ND) components for this VM interface</td>
<td>page 7-338</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Removes or reverts the VM interface settings</td>
<td>page 7-339</td>
</tr>
<tr>
<td><code>qos</code></td>
<td>Configures the Quality of Service (QoS) settings on this VM interface</td>
<td>page 7-340</td>
</tr>
<tr>
<td><code>switchport</code></td>
<td>Defines the switching mode settings for this VM interface</td>
<td>page 7-341</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Configures inbound IP and MAC address firewall rules for this VM interface</td>
<td>page 7-343</td>
</tr>
</tbody>
</table>
7.1.34.8.1 description

`interface-config-vm-instance`

Configures a short description of this VM interface

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

description <WORD>

**Parameters**

- description <WORD>

| description <WORD> | Provide a short description (64 characters maximum) that uniquely describes this VM interface and differentiates it from others with similar configurations. |

**Examples**

```plaintext
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#description "This VM interface is reserved for TEAM-URC"

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#show context
interface vmif2
description "This VM interface is reserved for TEAM-URC"
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#
```

**Related Commands**

- `no` | Removes the description configured for this VM interface
7.1.34.8.2 ip

- **interface-config-vm-instance**
  
  Configures IP settings related to ARP and DHCP responses

  Supported in the following platforms:
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ip [arp|dhcp]
```

```
ip arp [header-mismatch-validation|trust]
ip dhcp trust
```

**Parameters**

- **ip arp [header-mismatch-validation|trust]**
  - header-mismatch-validation – Enables a source MAC mismatch check in both the ARP and Ethernet headers. The option is enabled by default.
  - trust – Enables ARP trust on this VM interface. ARP packets received on this port are considered trusted, and information from these packets is used to identify rogue devices. The option is disabled by default.

- **ip dhcp trust**

**Examples**

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#ip arp trust
```

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#ip arp header-mismatch-validation
```

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#show context
interface vmif2
description "This VM interface is reserved for TEAM-URC"
ip arp trust
  ip arp header-mismatch-validation
```

**Related Commands**

- **no**
  
  Disables ARP response trust and source MAC mismatch check on this VM interface. Also disables DHCP response trust setting.
### 7.1.34.8.3 ipv6

Sets the DHCPv6 and ICMPv6 neighbor discovery (ND) components for this VM interface.

**Supported in the following platforms:**
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

- `ipv6 [dhcpv6|nd]`
- `ipv6 dhcpv6 trust`
- `ipv6 nd [header-mismatch-validation|raguard|trust]`

**Parameters**

- `ipv6 dhcpv6 trust`
- `ipv6 nd [header-mismatch-validation|raguard|trust]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ipv6 dhcpv6 trust</code></td>
<td>Sets the DHCPv6 trust state for DHCPv6 responses on this VM interface. When enabled, all DHCPv6 responses received on this port are trusted and forwarded. And a DHCPv6 server can be connected only on a trusted port. This option is enabled by default.</td>
</tr>
</tbody>
</table>
| `ipv6 nd [header-mismatch-validation|raguard|trust]` | Sets the IPv6 neighbor discovery settings for this VM interface.  
- `header-mismatch-validation`: Checks for mismatch of source MAC address in the ICMPv6 ND header and Ethernet header (link layer option). This option is disabled by default.  
- `raguard`: Allows redirection of router advertisements (RAs) and ICMPv6 packets originating on this interface. Router advertisements are periodically sent either to hosts or in response to solicitation requests. The RA includes IPv6 prefixes and other subnet and host information. This option is enabled by default.  
- `trust`: Sets trust state for ND requests received on this interface. When enabled, only DHCPv6 responses are trusted and forwarded on this VM interface, and a DHCPv6 server can be connected only to a trusted port. DHCPv6 relay agents receive messages from clients and forward them to a DHCPv6 server. The server sends responses back to the relay agent, and the relay agent sends the responses to the client on the local link. This option is disabled by default. |

**Examples**

```bash
nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B-if-vmif1)#ipv6 dhcpv6 trust

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B-if-vmif1)#ipv6 nd trust

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B-if-vmif1)#show context interface vmif1
   ipv6 dhcpv6 trust
   ipv6 nd trust

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B-if-vmif1)#
```

**Related Commands**

- `no` Removes or reverts IPv6 settings on this interface.
7.1.34.8.4 no

`interface-config-vm-instance`

Removes or reverts the VM interface settings

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [description|ip|ipv6|qos|switchport|use]

no ip [arp|dhcp]

no ip arp [header-mismatch-validation|trust]

no ip dhcp trust

no ipv6 [dhcpv6|nd]

no ipv6 dhcpv6 trust

no ipv6 nd [header-mismatch-validation|raguard|trust]

no qos trust [802.1p|cos|dscp]

no switchport [access vlan|mode|trunk native tagged]

no use [ip-access-list|ipv6-access-list|mac-access-list] in

Parameters
- no <PARAMETERS>

---

no <PARAMETERS> Removes or reverts this VM interface’s settings based on the parameters passed

Examples

The following example displays the VM interface settings before the ‘no’ commands are executed:

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#show context
interface vmif2
  description "This VM interface is reserved for TEAM-URC"
  switchport mode trunk
  switchport trunk native vlan 200
  no switchport trunk native tagged
  switchport trunk allowed vlan 200
  use ip-access-list in BROADCAST-MULTICAST-CONTROL
  ip arp trust
  ip arp header-mismatch-validation
```

The following example displays the VM interface settings after the ‘no’ commands have been executed:

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#show context
interface vmif2
  switchport mode trunk
  switchport trunk native vlan 200
  no switchport trunk native tagged
  switchport trunk allowed vlan 200
```
7.34.8.5 qos

Configure the Quality of Service (QoS) settings on this VM interface

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
qos trust [802.1p|cos|dscp]

Parameters
- qos trust [802.1p|cos|dscp]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>qos trust [802.1p</td>
<td>cos</td>
</tr>
<tr>
<td>trust dscp</td>
<td>Enables trust for IP Differentiated Services Code Point (DSCP) values received on this VM interface. The option is enabled by default. DSCP values in a IP packet determines the level of service assigned to the packet.</td>
</tr>
</tbody>
</table>

Examples
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#qos trust 802.1p
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#qos trust dscp
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#no qos trust cos

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#show context
interface vmif2
  switchport mode trunk
  switchport trunk native vlan 200
  no switchport trunk native tagged
  switchport trunk allowed vlan 200
  no qos trust 802.1p

Related Commands
- no | Removes QoS settings on this VM interface
### 7.1.34.8.6 switchport

**interface-config-vm-instance**

Defines the switching mode settings for this VM interface.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
switchport [access|mode|trunk]

switchport access vlan [<1-4094>|<VLAN-ALIAS-NAME>]

switchport mode [access|trunk]

switchport trunk [allowed|native]

switchport trunk allowed vlan [<1-4094>|add <VLAN-ID>|none|remove <VLAN-ID>]

switchport trunk native [tagged|vlan [<1-4094>|<VLAN-ALIAS-NAME>]]
```

**Parameters**

- **switchport access vlan [<1-4094>|<VLAN-ALIAS-NAME>]**
  
  Specifies the VLAN used when the switching mode is set to access. Use one of the following options to provide the VLAN ID:
  
  - `<1-4094>` – Specify the VLAN ID from 1 - 4094.
  - `<VLAN-ALIAS-NAME>` – Specify the VLAN alias name. The VLAN alias should be existing and mapped to the required VLAN interface.

  **Note:** use the `switchport > mode > access` command to select the access mode.

- **switchport mode [access|trunk]**
  
  Sets the VLAN switching mode over the VM interface. The options are: access and trunk.

  **access**
  
  Sets the VLAN switching mode to access. This option enables the VM interface to accept packets only from the native VLAN. Frames are forwarded untagged with no 802.1Q header. All frames received on the VM port are expected as untagged and are mapped to the native VLAN. This is the default setting.

  If selecting access, use the `switchport > access > vlan` command to specify the VLAN interfaces used in the access mode.

  **trunk**
  
  Sets the VLAN switching mode to trunk. This option enables the VM interface to allow packets from a list of VLANs added to the trunk. A VM interface configured as trunk supports multiple 802.1Q tagged VLANs and one native VLAN. The native VLAN can be tagged or untagged.

  If selecting trunk, use the `switchport > trunk > allowed/native` command to specify the VLANs and the native VLAN.

- **switchport trunk allowed vlan [<1-4094>|add <VLAN-ID>|none|remove <VLAN-ID>]**
  
  Specifies the VLANs allowed when the switching mode is set to trunk.

  Creates a list of allowed VLANs (from which packets can be accepted in the trunking mode). This command also allows the modification of an existing list.

Contd..
### switchport trunk native [tagged|vlan [<1-4094>|<VLAN-ALIAS-NAME>]]

<table>
<thead>
<tr>
<th>switchport trunk native</th>
<th>Specifies the native VLAN allowed when the switching mode is set to trunk</th>
</tr>
</thead>
<tbody>
<tr>
<td>tagged</td>
<td>Select this option to tag the native VLAN. Service Platforms support the IEEE 802.1Q specification for tagging frames and coordinating VLANs between devices. IEEE 802.1Q adds four bytes to each frame identifying the VLAN ID for upstream VMIF that the frame belongs. If the upstream VMIF does not support IEEE 802.1Q tagging, it does not interpret the tagged frames. When VLAN tagging is required between VM interface ports, both VM interfaces must support tagging and be configured to accept tagged VLANs. When a frame is tagged, a 12 bit frame VLAN ID is added to the 802.1Q header, so upstream VM interfaces know which VLAN ID the frame belongs to. The 12 bit VLAN ID is read and the frame is forwarded to the appropriate VLAN. When a frame is received with no 802.1Q header, the upstream VMIF classifies the frame using the default or native VLAN assigned to the Trunk port. The native VLAN allows a VM interface to associate untagged frames to a VLAN when no 802.1Q frame is included in the frame. This setting is disabled by default.</td>
</tr>
<tr>
<td>vlan [&lt;1-4094&gt;</td>
<td>&lt;VLAN-ALIAS-NAME&gt;]</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4094&gt; – Specify the native VLAN ID from 1 - 4094.</td>
</tr>
<tr>
<td></td>
<td>• &lt;VLAN-ALIAS-NAME&gt; – Specify the VLAN alias name. The VLAN alias should be existing and mapped to the required native VLAN interface.</td>
</tr>
</tbody>
</table>

#### Examples

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#switchport mode trunk

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#switchport trunk native vlan 200

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#show context interface vmif2
description "This VM interface is reserved for TEAM-URC"
switchport mode trunk
switchport trunk native vlan 200
no switchport trunk native tagged
switchport trunk allowed vlan 200
ip arp trust
ip arp header-mismatch-validation
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#

#### Related Commands

| no | Removes the switching mode settings |
### 7.1.34.8.7 use

Applies inbound IPv4, IPv6, and MAC specific firewall rules to this profile’s VM interface. The firewall inspects IP and MAC traffic flows and detects attacks typically not visible to traditional wired firewall appliances.

**Supported in the following platforms:**
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
use [ip-access-list|ipv6-access-list|mac-access-list] in <IP/IPv6/MAC-ACCESS-LIST-NAME>
```

**Parameters**

- **use [ip-access-list|ipv6-access-list|mac-access-list] in <IP/IPv6/MAC-ACCESS-LIST-NAME>**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>use ip-access-list in &lt;IP-ACCESS-LIST-NAME&gt;</td>
<td>Applies a IPv4 ACL to the inbound traffic on this VM interface. The IP ACL should be existing and configured.</td>
</tr>
<tr>
<td>use ipv6-access-list in &lt;IPv6-ACCESS-LIST-NAME&gt;</td>
<td>Applies a IPv6 ACL to the inbound traffic on this VM interface. The IPv6 ACL should be existing and configured.</td>
</tr>
<tr>
<td>use mac-access-list in &lt;MAC-ACCESS-LIST-NAME&gt;</td>
<td>Applies a MAC ACL to the inbound traffic on this VM interface. The MAC ACL should be existing and configured.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)# use ip-access-list in BROADCAST-MULTICAST-CONTROL

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)# show context
    interface vmif2
        description "This VM interface is reserved for TEAM-URC"
        switchport mode trunk
        switchport trunk native vlan 200
        no switchport trunk native tagged
        switchport trunk allowed vlan 200
        use ip-access-list in BROADCAST-MULTICAST-CONTROL
        ip arp trust
        ip arp header-mismatch-validation

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#
```

**Related Commands**

- **no** Removes the IP or MAC access control list associated with this VM interface
7.1.34.9 interface-config-bluetooth-instance

AP8432 and AP8533 model access points utilize a built-in Bluetooth chip for specific Bluetooth functional behaviors in a WiNG managed network. AP8432 and AP8533 models support both Bluetooth classic and Bluetooth low energy (BLE) technology. These platforms use their Bluetooth classic enabled radio to sense other Bluetooth enabled devices and report device data (MAC address, RSSI and device calls) to an ADSP server for intrusion detection. If the device presence varies in an unexpected manner, ADSP can raise an alarm.

NOTE: AP8132 model access points support an external USB Bluetooth radio providing ADSP Bluetooth classic sensing functionality only, not the BLE beaconing functionality available for AP8432 and AP8533 model access points described in this section.

AP8432 and AP8533 model access points support Bluetooth beaconing to emit either iBeacon or Eddystone-URL beacons. The access point’s Bluetooth radio sends non-connectable, undirected low-energy (LE) advertisement packets periodically. These advertisement packets are short and sent on Bluetooth advertising channels that conform to already-established iBeacon and Eddystone-URL standards. However, portions of the advertising packet are customizable via the Bluetooth radio interface configuration context.

To switch to this mode, use the following commands:

```
<DEVICE>(config)#profile <ap8432/ap8533> <PROFILE-NAME>

<DEVICE>(config-profile-default-ap8432)#interface bluetooth ?
<1-1>  Bluetooth interface index?
```

The following example uses the default-ap8432 profile instance to configure the Bluetooth radio interface:

```
nx9500-6C8809(config-profile-default-ap8432)#interface bluetooth 1
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#
```

Bluetooth Radio Mode commands:

- `beacon`: Configure low-energy beacon operation parameters
- `description`: Configure a description for this bluetooth radio
- `eddystone`: Configure eddystone beacon payload parameters
- `ibeacon`: Configure iBeacon beacon payload parameters
- `mode`: Set the Bluetooth operation mode
- `no`: Negate a command or set its defaults
- `shutdown`: Shutdown the selected bluetooth radio interface
- `clrscr`: Clears the display screen
- `commit`: Commit all changes made in this session
- `do`: Run commands from Exec mode
- `end`: End current mode and change to EXEC mode
- `exit`: End current mode and down to previous mode
- `help`: Description of the interactive help system
- `revert`: Revert changes
- `service`: Service Commands
- `show`: Show running system information
- `write`: Write running configuration to memory or terminal

```
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#
```

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>beacon</td>
<td>Configures the Bluetooth radio’s beacon’s emitted transmission pattern</td>
<td>page 7-346</td>
</tr>
<tr>
<td>description</td>
<td>Configures a description for the Bluetooth radio interface</td>
<td>page 7-348</td>
</tr>
<tr>
<td>eddystone</td>
<td>Configures Eddystone beacon payload parameters. Configure these parameters if the operational mode is set to ‘le-beacon’ and the beacon transmission pattern is set to ‘eddystone-url1’ or ‘eddystone-url2’.</td>
<td>page 7-349</td>
</tr>
</tbody>
</table>
Table 7.21 Bluetooth Radio Interface Config Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ibeacon</td>
<td>Configures iBeacon beacon payload parameters. Configure these parameters if the operational mode is set to 'le-beacon' and the beacon transmission pattern is set to 'ibeacon'.</td>
<td>page 7-350</td>
</tr>
<tr>
<td>mode</td>
<td>Configures the Bluetooth radio's mode of operation</td>
<td>page 7-352</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shutdowns the selected Bluetooth radio interface</td>
<td>page 7-353</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts to default this Bluetooth radio interface’s settings</td>
<td>page 7-354</td>
</tr>
</tbody>
</table>
### 7.1.34.9.1 beacon

*interface-config-blueooth-instance*

Configures the Bluetooth radio’s beacon’s emitted transmission pattern for Bluetooth radios functioning in the *low energy beacon* (le-beacon) mode. This option is applicable only if the Bluetooth radio’s operational mode is set to *le-beacon*.

Supported in the following platforms:

- Access Points – AP8432, AP8533

**Syntax**

```plaintext
beacon [pattern|period]
beacon pattern [eddystone-url1|eddystone-url2|ibeacon]
beacon period <100-10000>
```

**Parameters**

- **beacon pattern [eddystone-url1|eddystone-url2|ibeacon]**

  When the beacon mode is set to 'le-beacon', use this command to configure the Bluetooth radio’s beacon’s emitted transmission pattern. Select one of the following beacon patterns:

  - **eddystone-url1** – Transmits an Eddystone-URL beacon using URL 1. This is the default setting.
  - **eddystone-url2** – Transmits an Eddystone-URL beacon using URL 2
    An Eddystone-URL frame broadcasts a URL using a compressed encoding scheme to better fit within a limited advertisement packet. Once decoded, the URL can be used by a client for Internet access. If an Eddystone-URL beacon broadcasts https://anysite, clients receiving the packet can access that URL. If setting the transmission pattern as ‘eddystone-url1’ or ‘eddystone-url2’, use the ‘eddystone’ keyword to configure Eddystone beacon payload parameters. For more information, see [eddystone](#).
  - **ibeacon** – Transmits an ibeacon beacon. iBeacon was created by Apple for use in *iPhone OS* (iOS) devices (beginning with iOS version 7.0). There are three data fields Apple has made available to iOS applications, a *Universally Unique IDentifier* (UUID) for device identification, a *Major* value for device class and a *Minor* value for more refined information like product category. If setting the transmission pattern as ‘ibeacon’, use the ‘ibeacon’ keyword to configure ibeacon beacon payload parameters. For more information, see [ibeacon](#).

**Note:** For more information on configuring the Bluetooth radio’s operational mode, see [mode](#).

- **beacon period <100-10000>**

  Configures the Bluetooth radio’s beacon transmission period, in milliseconds, from 100 - 10000. As the defined period increases, so does the CPU processing time and the number of packets incrementally transmitted (typically one per minute).

  - **<100-10000>** – Specify a value from 100 - 10000 milliseconds. The default value is 1000 milliseconds.
Examples

nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#beacon pattern eddystone-url2

nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#beacon period 900

nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#show context interface bluetooth1
    shutdown
description AP8432-BLE-Radio1
mode le-beacon
beacon pattern eddystone-url2
beacon period 900

Related Commands

| no          | Removes or reverts to default this Bluetooth radio's beacon-related configurations |
7.1.34.9.2 description

- **interface-config-bluetooth-instance**

Configures a description for the Bluetooth radio interface, differentiating it from other Bluetooth supported radio’s within the same RF Domain.

Supported in the following platforms:
- Access Points – AP8432, AP8533

**Syntax**
description <WORD>

**Parameters**
- description <WORD>

| description <WORD> | Configures a description for the AP8432/AP8533 access point’s Bluetooth radio’s description
|-------------------|------------------------------------------------------------------------------------------------------------------|
| <WORD>            | Provide a description that uniquely identifies this radio interface from other similar Bluetooth supported radios (should not exceed 64 characters) within an RF Domain.

**Examples**
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#description AP8432-BLE-Radio1

nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#show context interface bluetooth1
  shutdown
  description AP8432-BLE-Radio1
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#

**Related Commands**

- **no** Removes this Bluetooth radio interface’s description
### 7.1.34.9.3 eddystone

**interface-config-bluetooth-instance**

Configures Eddystone beacon payload parameters. Configure these parameters only if the Bluetooth radio interface’s operational mode is set to ‘le-beacon’, and the beacon’s emitted transmission pattern is set to either ‘eddystone-url1’ or ‘eddystone-url2’.

Supported in the following platforms:
- Access Points – AP8432, AP8533

**Syntax**

```plaintext
eddystone [calibration-rssi <-127-127>|url [1|2] <WORD>]
```

**Parameters**
- eddystone [calibration-rssi|url [1|2] <WORD>]

| eddystone [calibration-rssi <-127-127>|url [1|2] <WORD>] | If the Beacon transmission pattern has been set to either ‘eddystone-url1’ or ‘eddystone-url2’, configure the following Eddystone parameters:
|----------------------------------------------------------|
| calibration-rssi – Configures the Eddystone beacon measured calibration signal strength, from -127 to 127 dBm, at 0 meters. Mobile devices can approximate their distance to beacons based on received signal strength. However, distance readings can fluctuate since they depend on several external factors. The closer you are to a beacon, the more accurate the reported distance. This setting is the projected calibration signal strength at 0 meters.
| <-127-127> – Specify a value from -127 - 127 dBm. The default value is -19 dBm.
| url [1|2] <WORD> – Configures the Eddystone URL as URL1 OR URL2
| 1 – Selects the Eddystone URL number 1
| 2 – Selects the Eddystone URL number 2

The following keyword is common to the ‘eddystone-url1’ and ‘eddystone-url2’ keywords:
- <WORD> – Enter a 64 character maximum eddystone-URL1/eddystone-URL2. The URL must be 18 characters or less once auto-encoding is applied. URL encoding is used when placing text in a query string to avoid confusion with the URL itself. It is typically used when a browser sends data to a Web server.

**Examples**

```plaintext
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#eddystone calibration-rssi -120

nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#show context interface bluetooth1
  shutdown
description AP8432-BLE-Radio1
  mode le-beacon
  beacon pattern eddystone-url2
  beacon period 900
  eddystone calibration-rssi -120

nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>no</th>
<th>Removes or reverts to default this Bluetooth radio’s Eddystone beacon payload configurations</th>
</tr>
</thead>
</table>
7.1.34.9.4 ibeacon

Configure iBeacon beacon payload parameters. Configure these parameters only if the Bluetooth radio interface’s operational mode is set to ‘le-beacon’, and the beacon’s emitted transmission pattern is set to ‘ibeacon’.

Supported in the following platforms:
• Access Points – AP8432, AP8533

Syntax
ibeacon [calibration-rssi <-127-127>|major <0-65535>|minor <0-65535>|uuid <WORD>]
ibeacon [calibration-rssi <-127-127]|uuid <WORD>]
ibeacon [major|minor] <0-65535>

Parameters
• ibeacon [calibration-rssi <-127-127>|major <0-65535>|minor <0-65535>|uuid <WORD>]

table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ibeacon</td>
<td>Configures following iBeacon beacon payload parameters: calibration-rssi, major, minor, and uuid</td>
</tr>
</tbody>
</table>
| calibration-rssi   | Configures the iBeacon measured calibration signal strength, from -127 to 127 dBm, at 1 meter. Mobile devices can approximate their distance to beacons based on received signal strength. However, distance readings can fluctuate since they depend on several external factors. The closer you are to a beacon, the more accurate the reported distance. This setting is the projected calibration signal strength at 1 meter.  
• <-127-127> – Specify a value from -127 - 127 dBm. The default value is -60 dBm. |
| major <0-65535>    | Configures the iBeacon Major value from 0 - 65535. Major values identify and distinguish groups. For example, each beacon on a specific floor in a building could be assigned a unique major value.  
• <0-65535> – Specify a value from 0 - 65535. The default value is 1111. |
| minor <0-65535>    | Configures the iBeacon Minor value from 0 - 65535. Minor values identify and distinguish individual beacons. Minor values help identify individual beacons within a group of beacons assigned a major value. The default setting is 2,222.  
• <0-65535> – Specify a value from 0 - 65535. The default value is 2222. |
| uuid <WORD>        | Configures a 32 hex character maximum UUID. The UUID classification contains 32 hexadecimal digits, split into 5 groups, separated by dashes. For example, f246da65fa82e841134bc5b71e0893e. The UUID distinguishes iBeacons in the network from all other beacons in networks outside of your direct administration.  
• <WORD> – Specify the UUID (should not exceed 32 hexadecimal characters). The default value is 01F101F101F101F101F101F101F1. |

Examples
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#ibeacon calibration-rssi -70
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#ibeacon major 1110
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#ibeacon minor 2210
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#ibeacon uuid f246da65fa82e841134bc5b71e0893e
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#show context interface bluetooth1
   shutdown
   mode le-beacon
   beacon pattern ibeacon
   ibeacon calibration-rssi -70
   ibeacon major 1110
   ibeacon minor 2210
   ibeacon uuid f2468da65fa82e841134bc5b71e0893e
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes or reverts to default this Bluetooth radio’s iBeacon beacon payload parameters</td>
</tr>
</tbody>
</table>
7.1.34.9.5 mode

Configures the Bluetooth radio interface’s mode of operation as bt-sensor or le-beacon

Supported in the following platforms:
- Access Points – AP8432, AP8533

Syntax
mode [bt-sensor|le-beacon]

Parameters
- mode [bt-sensor|le-beacon]

<table>
<thead>
<tr>
<th>mode</th>
<th>Configures the Bluetooth radio interface’s mode of operation. The options are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- bt-sensor – Select this option to provide Bluetooth support for legacy devices. bt-sensors are Bluetooth classic sensors providing robust wireless connections for legacy devices. Typically these connections are not ideally suited for the newer Bluetooth low energy (BLE) technology supported devices.</td>
</tr>
<tr>
<td></td>
<td>- le-beacon – Select this option to provide Bluetooth support for newer BLE technology supported devices. le-beacons are newer Bluetooth low energy beacons ideal for applications requiring intermittent or periodic transfers of small amounts of data. le-beacons are not designed as replacements for classic beacon sensors. This is the default setting.</td>
</tr>
</tbody>
</table>

Examples
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#mode le-beacon

nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#show context
interface bluetooth
   shutdown
   mode le-beacon
   beacon pattern ibeacon
   ibeacon calibration-rssi -70
   ibeacon major 1110
   ibeacon minor 2210
   ibeacon uuid f2468da65fa82e841134bc5b71e0893e
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#

Related Commands
no
Reverts this Bluetooth radio's mode of operation to le-beacon
7.1.34.9.6 shutdown

**interface-config-bluetooth-instance**

Shut downs the selected AP8432/AP8533 Bluetooth radio interface

Supported in the following platforms:
- Access Points – AP8432, AP8533

**Syntax**

```
shutdown
```

**Parameters**

None

**Examples**

```
nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#shutdown

nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#show context
interface bluetooth1
    shutdown
    mode le-beacon
    beacon pattern ibeacon
    ibeacon calibration-rssi -70
    ibeacon major 1110
    ibeacon minor 2210
    ibeacon uuid f2468da65fa82e841134bc5b71e0893e

nx9500-6C8809(config-profile-default-ap8432-if-bluetooth1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Reverses shutdown</td>
</tr>
</tbody>
</table>
7.1.34.9.7 no

*interface-config-blueooth-instance*

Removes or reverts to default this AP8432/AP8533 Bluetooth radio interface’s settings

Supported in the following platforms:

- Access Points – AP8432, AP8533

**Syntax**

no [beacon|description|eddystone|ibeacon|mode|shutdown]

no beacon [pattern|period]

no description

no eddystone [calibration-rssi|url [1|2]]

no ibeacon [calibration-rssi|major|minor|uuid]

no mode

no shutdown

**Parameters**

- no <PARAMETERS>

  no <PARAMETERS> Removes or reverts to default this Bluetooth radio interface’s settings based on the parameters passed

  - <PARAMETERS> – Specify the parameters.

**Examples**

The following example shows the AP8432 default profile’s Bluetooth radio interface settings:

```bash
nx9500-6C8809(config-profile-default-ap8432-if-blueooth1)#show context
interface bluetooth1
  shutdown
  mode le-beacon
  beacon pattern ibeacon
  ibeacon calibration-rssi -70
  ibeacon major 1110
  ibeacon minor 2210
  ibeacon uuid f2468da65fa82e841134bc5b71e0893e
```  

```bash
nx9500-6C8809(config-profile-default-ap8432-if-blueooth1)#no shutdown
```

```bash
nx9500-6C8809(config-profile-default-ap8432-if-blueooth1)#no ibeacon minor
```

```bash
nx9500-6C8809(config-profile-default-ap8432-if-blueooth1)#no ibeacon calibration-rssi
```

The following example shows the AP8432 default profile’s Bluetooth radio interface settings after the ‘no’ commands are executed:

```bash
nx9500-6C8809(config-profile-default-ap8432-if-blueooth1)#show context
interface bluetooth1
  no shutdown
  mode le-beacon
  beacon pattern ibeacon
  ibeacon major 1110
  ibeacon uuid f2468da65fa82e841134bc5b71e0893e
```  

```bash
nx9500-6C8809(config-profile-default-ap8432-if-blueooth1)#
```
7.1.35 *ip*

*Profile Config Commands*

The following table summarizes NAT pool configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ip</em></td>
<td>Configures IP components, such as default gateway, DHCP, DNS server forward</td>
<td><em>page 7-356</em></td>
</tr>
<tr>
<td></td>
<td>ing, name server, domain name, routing standards, etc.</td>
<td></td>
</tr>
<tr>
<td>*nat-pool-config-</td>
<td>Invokes NAT pool configuration parameters</td>
<td><em>page 7-362</em></td>
</tr>
<tr>
<td><em>instance</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.1.35.1  ip

Configures IPv4 routing components, such as default gateway, DHCP, DNS server forwarding, name server, domain name, routing standards, etc.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
ip [default-gateway|dhcp|dns-server-forward|domain-lookup|domain-name|igmp|
    name-server|nat|route|routing]
ip default-gateway [<IP>|<HOST-ALIAS-NAME>|failover|priority [dhcp-client <1-1800>|
    static-route <1-1800>]]
ip [dns-server-forward|domain-lookup|domain-name <DOMAIN-NAME>|name-server <IP>|
    routing]
ip dhcp client [hostname|persistent-lease]
ip igmp snooping {fast-leave|forward-unknown-multicast|querier}
ip igmp snooping {fast-leave|forward-unknown-multicast}
ip igmp snooping {querier} {max-response-time <1-25>|query-interval <1-18000>|
    robustness-variable <1-7>|timer expiry <60-300>|version <1-3>}
ip nat [crypto|inside|outside|pool]
ip nat [crypto source pool|pool] <NAT-POOL-NAME>
ip nat [inside|outside] [destination|source]
ip nat [inside|outside] destination static <ACTUAL-IP> <1-65535> [tcp|udp]
    ((<NATTED-IP> <1-65535>))
ip nat [inside|outside] source [list|static]
ip nat [inside|outside] source static <ACTUAL-IP> <1-65535> [tcp|udp]
    ((<NATTED-IP> <1-65535>))
ip nat [inside|outside] source list <IP-ACCESS-LIST-NAME> interface [<INTERFACE-NAME>|pppoel|vlan <1-4094>|wwan1] [(address <IP>|interface <L3-IF-NAME>|overload|
    pool <NAT-POOL-NAME>)]
ip route <IP/M> [<IP>|<HOST-ALIAS-NAME>]
```

NOTE: The command 'ip igmp snooping' can be configured under bridge VLAN context also. For example: rfs7000-37FABE(config-device 00-15-70-37-FA-BE-bridge-vlan-1)#ip igmp snooping forward-unknown-multicast
### Parameters

- **ip default-gateway** [<IP>|<HOST-ALIAS-NAME>|failover|priority [dhcp-client <1-1800>|static-route <1-1800>]]
  - **ip** Configures IPv4 routing components
  - **default-gateway** Configures default gateway (next-hop router) parameters
  - **<IP>** Configures default gateway’s IP address
    - **<IP>** – Specify the default gateway’s IP address.
  - **failover** Configures failover to the gateway (with next higher priority) when the current default gateway is unreachable (in case of multiple default gateways). This option is enabled by default.
  - **<HOST-ALIAS-NAME>** Configures the host alias mapped to the required default gateway
    - **<HOST-ALIAS-NAME>** – Specify the host alias name (should be existing and configured). Host alias names begin with a ‘$’.
  - **priority [dhcp-client <1-1800> static-route <1-1800>]**
    - **dhcp-client <1-1800>** – Defines a priority for the default gateway acquired by the DHCP client on the VLAN interface. The default setting is 1000.
    - **static-route <1-1800>** – Defines the weight (priority) assigned to this static route versus others that have been defined to avoid potential congestion. The default setting is 100.
    - The following keyword is common to ‘dhcp-client’ and ‘static-route’ parameters:
      - **<1-1800>** – Specify the priority from 1 - 18000 (lower the value higher is the priority).

- **ip [dns-server-forward|domain-lookup|domain-name <DOMAIN-NAME>|name-server <IP>|routing]**
  - **ip** Configures IPv4 routing components
  - **dns-server-forward** Enables DNS forwarding. This command enables the forwarding of DNS queries to DNS servers outside of the network. This option is disabled by default.
  - **domain-lookup** Enables domain lookup. When enabled, human friendly domain names are converted into numerical IP destination addresses. The option is enabled by default.
  - **domain-name <DOMAIN-NAME>** Configures a default domain name
    - **<DOMAIN-NAME>** – Specify a name for the DNS (should not exceed 64 characters in length).
  - **name-server <IP>** Configures the name server’s IP address
    - **<IP>** – Specify the IP address of the name server.
  - **routing** Enables IP routing of logically addressed packets from their source to their destination. IPv4 routing is enabled by default.

- **ip dhcp client [hostname|persistent-lease]**
  - **ip** Configures IPv4 routing components
  - **dhcp** Configures the DHCP client and host
### ip igmp snooping

**fast-leave**
- Enables fast leave processing. When enabled, leave messages are processed quickly, preventing the host from receiving further traffic. Should be configured for one (wired) host network only. This option is disabled by default.

**forward-unknown-multicast**
- Enables unknown multicast data packets to be flooded in the specified VLAN. This option is disabled by default.

### ip nat

**crypto source pool**
- Configures the NAT source address translation settings for IPSec tunnels
  - `<NAT-POOL-NAME>` – Specify a NAT pool name.

**pool**
- Configures a pool of IP addresses for NAT
  - `<NAT-POOL-NAME>` – Specify a name for the NAT pool.

### ip

**Configures IPv4 routing components**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>client [hostname]</td>
<td>Sets the DHCP client</td>
</tr>
<tr>
<td>[persistent-lease]</td>
<td>- hostname – Includes the hostname in the DHCP lease for the requesting client. This option is enabled by default.</td>
</tr>
<tr>
<td></td>
<td>- persistent-lease – Retains the last lease across reboot if the DHCP server is unreachable. A persistent DHCP lease assigns the same IP address and other network information to the device each time it renews its DHCP lease. This option is disabled by default.</td>
</tr>
</tbody>
</table>

### igmp snooping

**querier**
- Enables the IGMP querier functionality for the specified VLAN. By default IGMP snooping querier is disabled.

**max-response-time <1-25>**
- Configures the IGMP maximum query response interval used in IGMP V2/V3 queries for the given VLAN. The default is 10 seconds.

**query-interval <1-18000>**
- Configures the IGMP querier query interval in seconds. Specify a value from 1 - 18000 seconds. The default is 60 seconds.

**robustness-variable <1-7>**
- Configures the IGMP robustness variable from 1 - 7. The default is 2.

**timer expiry <60-300>**
- Configures the other querier time out value for the given VLAN. The default is 60 seconds.

**version <1-3>**
- Configures the IGMP query version for the given VLAN. The default is 3.
### ip nat [inside|outside] destination static <ACTUAL-IP> <1-65535> [tcp|udp] [<(NATTED-IP) {<1-65535>}>]

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip</td>
<td>Configures IPv4 routing components</td>
</tr>
<tr>
<td>nat</td>
<td>Configures the NAT parameters</td>
</tr>
<tr>
<td>[inside</td>
<td>outside]</td>
</tr>
<tr>
<td>destination static &lt;ACTUAL-IP&gt;</td>
<td>Specifies destination address translation parameters</td>
</tr>
<tr>
<td>&lt;1-65535&gt; [tcp</td>
<td>udp]</td>
</tr>
<tr>
<td>&lt;NATTED-IP&gt; &lt;1-65535&gt;</td>
<td>Enables configuration of the outside natted IP address</td>
</tr>
</tbody>
</table>

### ip nat [inside|outside] source static <ACTUAL-IP> <1-65535> [tcp|udp] [<(NATTED-IP) {<1-65535>}>]

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip</td>
<td>Configures IPv4 routing components</td>
</tr>
<tr>
<td>nat</td>
<td>Configures the NAT parameters</td>
</tr>
<tr>
<td>[inside</td>
<td>outside]</td>
</tr>
<tr>
<td>source static &lt;ACTUAL-IP&gt;</td>
<td>Specifies source address translation parameters</td>
</tr>
<tr>
<td>&lt;1-65535&gt; [tcp</td>
<td>udp]</td>
</tr>
<tr>
<td>&lt;NATTED-IP&gt; &lt;1-65535&gt;</td>
<td>Enables configuration of the outside natted IP address</td>
</tr>
</tbody>
</table>

### ip nat [inside|outside] source list <IP-ACCESS-LIST-NAME> interface [[<INTERFACE-NAME> | pppoe1|vlan <1-4094>|wwan1] [(<address <IP>|interface <L3-IF-NAME>|overload|pool <NAT-POOL-NAME>)]

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip</td>
<td>Configures IPv4 routing components</td>
</tr>
<tr>
<td>nat</td>
<td>Configures the NAT parameters</td>
</tr>
<tr>
<td>[inside</td>
<td>outside]</td>
</tr>
</tbody>
</table>
source list <IP-ACCESS-LIST-NAME>
- Configures an access list describing local addresses
  - <IP-ACCESS-LIST-NAME> – Specify a name for the IP access list.

interface [<INTERFACE-NAME>]
- Selects an interface to configure. Select a layer 3 router interface or a VLAN interface.
  - <INTERFACE-NAME> – Selects a layer 3 interface. Specify the layer 3 router interface name.
  - vlan – Selects a VLAN interface
    - <1-4094> – Set the SVI VLAN ID of the interface.
    - pppoe1 – Selects PPP over Ethernet interface
    - wwan1 – Selects Wireless WAN interface

address <IP>
- The following keyword is recursive and common to all interface types:
  - address <IP> – Configures the interface IP address used with NAT

interface <L3-IF-NAME>
- The following keyword is recursive and common to all interface types:
  - interface <L3-IF-NAME> – Configures a wireless controller or service platform’s VLAN interface
    - <L3IFNAME> – Specify the SVI VLAN ID of the interface.

overload
- The following keyword is recursive and common to all interface types:
  - overload – Enables use of global address for many local addresses

pool <NAT-POOL-NAME>
- The following keyword is recursive and common to all interface types:
  - pool <NAT-POOL-NAME> – Specifies the NAT pool
    - <NAT-POOL-NAME> – Specify the NAT pool name.

ip route <IP/M> [<IP>|<HOST-ALIAS-NAME>]
- configures IPv4 routing components

Examples
rfs7000-37FABE(config-profile-default-rfs7000)#ip default-gateway 172.16.10.4
rfs7000-37FABE(config-profile-default-rfs7000)#ip dns-server-forward
rfs7000-37FABE(config-profile-default-rfs7000)#ip nat inside source list test interface vlan 1 pool pool1 overload
rfs7000-37FABE(config-profile-default-rfs7000)#show context profile rfs7000 default-rfs7000
  bridge vlan 1
  bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier
  ip default-gateway 172.16.10.4
  autoinstall configuration
  autoinstall firmware
  crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ikev2 policy ikev2-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
............................................................................
qos trust 802.1p
interface ge3
    ip dhcp trust
    qos trust dscp
    qos trust 802.1p
interface ge4
    ip dhcp trust
    qos trust dscp
    qos trust 802.1p
interface pppoe1
    use firewall-policy default
    ip dns-server-forward
ip nat inside source list test interface vlan1 pool pool1 overload
    service pm sys-restart
router ospf
rfs7000-37FABE(config-profile-default-rfs7000) #
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#?
Nat Policy Mode commands:
    address  Specify addresses for the nat pool
    no       Negate a command or set its defaults
    clrscr   Clears the display screen
    commit   Commit all changes made in this session
    do       Run commands from Exec mode
    end      End current mode and change to EXEC mode
    exit     End current mode and down to previous mode
    help     Description of the interactive help system
    revert   Revert changes
    service  Service Commands
    show     Show running system information
    write    Write running configuration to memory or terminal
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)

Related Commands

| no          | Disables or reverts settings to their default |
7.1.35.2 nat-pool-config-instance

Use the config-profile-<DEVICE-PROFILE-NAME> instance to configure Network Address Translation (NAT) pool settings.

The following example uses the config-profile-default-rfs7000 instance to configure NAT pool settings:

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000)#ip nat pool pool1
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#
```

```
? Nat Policy Mode commands:
  address Specify addresses for the nat pool
  no Negate a command or set its defaults
  clrscr Clears the display screen
  commit Commit all changes made in this session
  do Run commands from Exec mode
  end End current mode and change to EXEC mode
  exit End current mode and down to previous mode
  help Description of the interactive help system
  revert Revert changes
  service Service Commands
  show Show running system information
  write Write running configuration to memory or terminal
```

The following table summarizes NAT pool configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>address</td>
<td>Configures NAT pool addresses</td>
<td>page 7-363</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 7-364</td>
</tr>
</tbody>
</table>
7.1.35.2.1 address

Configure NAT pool of IP addresses

Define a range of IP addresses hidden from the public Internet. NAT modifies network address information in the defined IP range while in transit across a traffic routing device. NAT only provides IP address translation and does not provide a firewall. A branch deployment with NAT by itself will not block traffic from being potentially routed through a NAT device. Consequently, NAT should be deployed with a stateful firewall.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

address [IP|range <START-IP> <END-IP>]

Parameters

- address [IP|range <START-IP> <END-IP>]

<table>
<thead>
<tr>
<th>address &lt;IP&gt;</th>
<th>Adds a single IP address to the NAT pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>range &lt;START-IP&gt; &lt;END-IP&gt;</td>
<td>Adds a range of IP addresses to the NAT pool</td>
</tr>
<tr>
<td></td>
<td>• &lt;START-IP&gt; – Specify the starting IP address of the range.</td>
</tr>
<tr>
<td></td>
<td>• &lt;END-IP&gt; – Specify the ending IP address of the range.</td>
</tr>
</tbody>
</table>

Examples

```bash
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#address range 172.16.10.2 172.16.10.8
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#show context
ip nat pool pool1
  address range 172.16.10.2 172.16.10.8
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#
```

Related Commands

- **no** | Removes address(es) configured with this NAT pool |
7.1.35.2.2 no

- **nat-pool-config-instance**

Removes address(es) configured with this NAT pool

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no address [<IP>|range <START-IP> <END-IP>]
```

**Parameters**

- no address [<IP>|range <START-IP> <END-IP>]

| no address [<IP>|range <START-IP> <END-IP>] | Removes a single IP address or a range of IP addresses from this NAT pool |
|-----------------------------------------------|-------------------------------------------------------------------------|

**Usage Guidelines**

The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#show context
ip nat pool pool1
    address range 172.16.10.2 172.16.10.8
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#
```

```
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#no address range 172.16.10.2 172.16.10.8
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#show context
ip nat pool pool1
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#
```

**Related Commands**

| address | Configures NAT pool IP address(es) |
7.1.36 ipv6

Profile Config Commands
Configures IPv6 routing components, such as default gateway, DNS server forwarding, name server, routing standards, etc.

These IPv6 settings are applied to all devices using this profile.

You can also configure IPv6 settings on a device, using the device’s configuration mode.

Supported in the following platforms:
• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
ipv6 [default-gateway|dns-server-forward|hop-limit|mld|name-server|nd-reachable-time|neighbor|ns-interval|ra-convert|route|ula-reject-route|unicast-routing]
ipv6 [default-gateway <IPv6> {vlan <VLAN-ID}>|dns-server-forward|hop-limit <1-255>|
name-server <IPv6>|nd-reachable-time <5000-3600000>|ns-interval <1000-3600000>| ula-reject-route|unicast-routing]
ipv6 ra-convert {throttle interval <3-1800> max-RAs <1-256>}
ipv6 mld snooping {forward-unknown-multicast|querier}
ipv6 mld snooping {forward-unknown-multicast}
ipv6 mld snooping {querier} {max-response-time <1-25000>|query-interval <1-18000>|
robustness-variable <1-7>|timer expiry <60-300>|version <1-2>}
ipv6 neighbor [<IPv6>|timeout]
ipv6 neighbor <IPv6> <MAC> [INTF-NAME|pppoel|vlan <1-4094]|wwan1] {dhcp-server/
router}
ipv6 neighbor timeout <15-86400>
ipv6 route <DEST-IPV6-PREFIX/PREFIX-LENGTH> <IPv6-GATEWAY-ADDRESS> {vlan <VLAN-ID>}

Parameters
• ipv6 [default-gateway <IPv6> {vlan <VLAN-ID}>|dns-server-forward|hop-limit <1-255>|
name-server <IPv6>|nd-reachable-time <5000-3600000>|ns-interval <1000-3600000>| ula-reject-route|unicast-routing]

<table>
<thead>
<tr>
<th>ipv6</th>
<th>Configures IPv6 routing components</th>
</tr>
</thead>
<tbody>
<tr>
<td>default-gateway &lt;IPv6&gt;</td>
<td>Configures IPv6 default gateway’s address in the ::/0 format</td>
</tr>
<tr>
<td>{vlan &lt;VLAN-ID&gt;}</td>
<td>• vlan &lt;VLAN-ID&gt; – Optional. Specify the VLAN interface’s ID through which the default gateway is accessible.</td>
</tr>
<tr>
<td>dns-server-forward</td>
<td>Enables DNS server forwarding. This command enables the forwarding of DNS queries to DNS servers outside of the network. This feature is disabled by default.</td>
</tr>
<tr>
<td>hop-limit &lt;1-255&gt;</td>
<td>Configures the IPv6 hop count limit</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-255&gt; – Specify a value between 1 - 255. The default is 64.</td>
</tr>
</tbody>
</table>

NOTE: The IPv6 settings configured at the profile/device level are global configuration settings and not interface-specific.
### name-server \( <\text{IPv6}> \)
Configures the IPv6 name server's address
- \(<\text{IPv6}>\) – Specify the address of the IPv6 name server.

### nd-reachable-time \(<5000-3600000>\)
Configures the time, in milliseconds, that a neighbor is assumed to be reachable after having received neighbor discovery (ND) confirmation for their reachability
- \(<5000-3600000>\) – Specify a value from 5000 - 3600000 milliseconds. The default is 30,000 milliseconds.

### ns-interval \(<1000-3600000>\)
Configures the interval, in milliseconds, between two consecutive retransmitted neighbor solicitation (NS) messages. NS messages are sent by a node to determine the link layer address of a neighbor, or verify a neighbor is still reachable via a cached link-layer address.
- \(<1000-3600000>\) – Specify a value from 1000 - 3600000. The default is 1000 milliseconds.

### ula-reject-route
Installs a "reject" route for Unique Local Address (ULA) prefixes. This ensures that site-border routers and firewalls do not forward packets with ULA source or destination addresses outside of the site, unless explicitly configured with routing information about specific /48 or longer Local IPv6 prefixes. This option is disabled by default.
The ULA is an IPv6 address used in private networks for local communication within a site (for example a company, campus, or within a set of branch office networks). These site local addresses are IPv6 addresses that fall in the block fc00::/7, defined in RFC 4193.

### unicast-routing
Enables IPv6 unicast routing. This feature is enabled by default.

- \( \text{ipv6 ra-convert} \{ \text{throttle interval} \ <3-1800> \ \text{max-RAs} \ <1-256> \} \)

### ipv6 Configures IPv6 routing components

| ra-convert {throttle interval \(<3-1800>\) max-RAs \(<1-256>\) } | Enables conversion of multicast router advertisements (RAs) to unicast RAs at the dot11 layer. This feature is disabled by default.
| | • throttle – Optional. Throttles multicast RAs before converting to unicast
| | • interval \(<3-1800>\) – Throttles multicast RAs for a specified time period. Specify the interval from 3 - 1800 seconds. The default is 3 seconds.
| | • max-RAs \(<1-256>\) – Specifies the maximum number of RAs per IPv6 router during the specified throttle interval. Specify a value from 1 - 256. The default is 1.

- \( \text{ipv6 mld snooping} \{ \text{forward-unknown-multicast} \} \)

### ipv6 Configures IPv6 routing components

| mld snooping forward-unknown-multicast | Enables multicast listener discovery (MLD) protocol snooping. This feature is disabled by default.
| | When enabled, IPv6 devices (access point, wireless controller, or service platform) can examine MLD messages exchanged between hosts and multicast routers to discern which hosts are receiving multicast group traffic. Based on the information gathered these devices forward multicast traffic only to those interfaces connected to interested receivers instead of flooding traffic to all interfaces. This prevents VLANs from getting flooded with IPv6 multicast traffic.
| | • forward-unknown-multicast – Optional. Enables unknown multicast forwarding. This feature is enabled by default.
- **ipv6 mld snooping** `{querier} {max-response-time <1-25000>|query-interval <1-18000>|robustness-variable <1-7>|timer expiry <60-300>|version <1-2}>`

<table>
<thead>
<tr>
<th>ipv6</th>
<th>Configures IPv6 routing components</th>
</tr>
</thead>
<tbody>
<tr>
<td>mld snooping querier</td>
<td>Enables MLD protocol snooping</td>
</tr>
<tr>
<td></td>
<td>• querier – Optional. Enables the on-board MLD querier. When enabled, IPv6 devices send query messages to discover which network devices are members of a given multicast group. This option is disabled by default.</td>
</tr>
<tr>
<td>max-response-time</td>
<td>Configures the MLD querier’s maximum query response time. This is the time for which the querier waits before sending a responding report. Queriers use MLD reports to join and leave multicast groups and receive group traffic.</td>
</tr>
<tr>
<td>&lt;1-25000&gt;</td>
<td>• &lt;1-25000&gt; – Specify a value from 1 - 25000 milliseconds. The default is 10 milliseconds.</td>
</tr>
<tr>
<td>query-interval</td>
<td>Configures the interval, in seconds, between two consecutive MLD querier’s queries. The robustness variable is an indication of how susceptible the subnet is to lost packets. MLD can recover from robustness variable minus 1 lost MLD packets.</td>
</tr>
<tr>
<td>&lt;1-18000&gt;</td>
<td>• &lt;1-18000&gt; – Specify a value from 1 - 18000 seconds. The default is 60 seconds.</td>
</tr>
<tr>
<td>robustness-variable</td>
<td>Configures the MLD IGMP robustness variable. This value is used by the sender of a query.</td>
</tr>
<tr>
<td>&lt;1-7&gt;</td>
<td>• &lt;1-7&gt; – Select a value from 1 - 7. The default is 2.</td>
</tr>
<tr>
<td>timer expiry</td>
<td>Configures the MLD other querier (any external querier) timeout</td>
</tr>
<tr>
<td>&lt;60-300&gt;</td>
<td>• &lt;60-300&gt; – Specify a value from 60 - 300 seconds. The default is 60 seconds.</td>
</tr>
<tr>
<td>version</td>
<td>Configures the MLD querier’s version. MLD version 1 is based on IGMP version 2 for IPv4. MLD version 2 is based on IGMP version 3 for IPv4 and is fully backward compatible. IPv6 multicast uses MLD version 2.</td>
</tr>
<tr>
<td>&lt;1-2&gt;</td>
<td>• &lt;1-2&gt; – Select the MLD version from 1 - 2. The default is 2.</td>
</tr>
</tbody>
</table>

- **ipv6 neighbor** `<IPv6>` `<MAC>` `[<INTF-NAME>|pppoe1|vlan <1-4094>|wwan1] {dhcp-server|router}

<table>
<thead>
<tr>
<th>ipv6</th>
<th>Configures IPv6 routing components</th>
</tr>
</thead>
<tbody>
<tr>
<td>neighbor</td>
<td>Configures static IPv6 neighbor entries</td>
</tr>
<tr>
<td><code>&lt;IPv6&gt;</code></td>
<td>Specify the IPv6 address for which a static neighbor entry is created.</td>
</tr>
<tr>
<td><code>&lt;MAC&gt;</code></td>
<td>Specify the MAC address associated with the specified IPv6 address.</td>
</tr>
<tr>
<td>`[&lt;INTF-NAME&gt;</td>
<td>pppoe1</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;INTF-NAME&gt;</code> – Selects the layer 3 router interface. Specify the interface name.</td>
</tr>
<tr>
<td></td>
<td>• pppoe1 – Selects the PPP over Ethernet interface</td>
</tr>
<tr>
<td></td>
<td>• vlan <code>&lt;1-4094&gt;</code> – Selects the VLAN interface. Specify the VLAN interface index.</td>
</tr>
<tr>
<td></td>
<td>• wwan1 – Selects the wireless WAN interface</td>
</tr>
<tr>
<td>`{dhcp-server</td>
<td>router}`</td>
</tr>
<tr>
<td></td>
<td>• dhcp-server – Optional. States this neighbor entry is for a DHCP server</td>
</tr>
<tr>
<td></td>
<td>• router – Optional. States this neighbor entry is for a router</td>
</tr>
</tbody>
</table>
- ipv6 neighbor timeout <15-86400>

<table>
<thead>
<tr>
<th>neighbor</th>
<th>Configures static IPv6 neighbor entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>timeout &lt;15-86400&gt;</td>
<td>Configures the timeout, in seconds, for the static neighbor entries</td>
</tr>
<tr>
<td>• &lt;15-86400&gt;</td>
<td>Specify a value from 15 - 86400 seconds. The default is 3600 seconds.</td>
</tr>
</tbody>
</table>

- ipv6 route <DEST-IPv6-PREFIX/PREFIX-LENGTH> <IPv6-GATEWAY-ADDRESS> {vlan <VLAN-ID>}

<table>
<thead>
<tr>
<th>ipv6</th>
<th>Configures IPv6 routing components</th>
</tr>
</thead>
<tbody>
<tr>
<td>route</td>
<td>Configures the static routes</td>
</tr>
<tr>
<td>These routes are maintained in the IPv6 Forwarding Information Base (FIB).</td>
<td></td>
</tr>
<tr>
<td>Note: To view FIB6 routing entries, use the service &gt; show fib6 &gt; &lt;TABLE-ID&gt; command.</td>
<td></td>
</tr>
<tr>
<td>&lt;DEST-IPv6-PREFIX/PREFIX-LENGTH&gt;</td>
<td>Specify the IPv6 destination prefix (IPv6 network) and the prefix length.</td>
</tr>
<tr>
<td>&lt;IPv6-GATEWAY-ADDRESS&gt;</td>
<td>Specify the IPv6 gateway’s address.</td>
</tr>
<tr>
<td>vlan &lt;VLAN-ID&gt;</td>
<td>Optional. specify the VLAN interface’s ID (through which the default gateway is accessible)</td>
</tr>
<tr>
<td>Note: This parameter is needed only if the gateway address is a link local address.</td>
<td></td>
</tr>
</tbody>
</table>

Examples
rfs7000-6DCD4B(config-profile-TestRFS7000)#ipv6 default-gateway 2001:10:10:10:10:10:10:2
rfs7000-6DCD4B(config-profile-TestRFS7000)#ipv6 dns-server-forward
rfs7000-6DCD4B(config-profile-TestRFS7000)#ipv6 mld snooping
rfs7000-6DCD4B(config-profile-TestRFS7000)#show context profile rfs7000 TestRFS7000
  ipv6 mld snooping
  ipv6 dns-server-forward
  ipv6 default-gateway 2001:10:10:10:10:10:10:2
  no autoinstall configuration
  no autoinstall firmware
  crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
--More--
rfs7000-6DCD4B(config-profile-TestRFS7000)#

Related Commands

| no | Disables or reverts IPv6 settings to their default |
7.1.37 l2tpv3

Profile Config Commands

Defines the L2TPv3 settings for tunneling layer 2 payloads using VPNs

L2TPv3 is an IETF standard that defines the control and encapsulation protocol settings for tunneling layer 2 frames in an IP network (and access point profile) between two IP nodes. Use L2TPv3 to create tunnels for transporting layer 2 frames. L2TPv3 enables WiNG supported controllers and access points to create tunnels for transporting Ethernet frames to and from bridge VLANs and physical ports. L2TPv3 tunnels can be defined between WiNG devices and other vendor devices supporting the L2TPv3 protocol.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

l2tpv3 [hostname <HOSTNAME>|inter-tunnel-bridging|logging|manual-session|
router-id [<1-4294967295>|<IP>]|tunnel|udp-listen-port <1024-65535>]

l2tpv3 logging ip-address [<IP>|any] hostname [<HOSTNAME>|any]
router-id [<IP>|<WORD>|any]

Parameters

- hostname <HOSTNAME> — Configures the host name sent in the L2TPv3 signalling messages. Tunnel establishment involves exchanging 3 message types (SCCRQ, SCCR and SCCN) with the peer. Tunnel IDs and capabilities are exchanged during the tunnel establishment with the host.
  - <HOSTNAME> – Specify the L2TPv3 specific host name.

- inter-tunnel-bridging — Enables inter tunnel bridging of packets. This feature is disabled by default.

- manual-session — Creates/modifies L2TPv3 manual sessions
  For more information, see l2tpv3-manual-session-commands.

- router-id [<1-4294967295>|<IP>] — Configures the router ID sent in the L2TPv3 signalling messages. These signalling (AVP) messages help to identify tunneled peers.
  - <1-4294967295> – Configures the router ID in decimal format from 1 - 4294967295
  - <IP> – Configures the router ID in the IP address (A.B.C.D) format

- tunnel — Creates/modifies a L2TPv3 tunnel
  For more information, see l2tpv3-tunnel-commands.

- udp-listen-port <1024-65535> — Configures the UDP port used to listen for incoming traffic
  - <1024-65535> – Specify the UDP port from 1024 - 65535 (default is 1701)
- l2tpv3 logging ip-address [<IP>|any] hostname [<HOSTNAME>|any] router-id [<IP>|<WORD>|any]

<table>
<thead>
<tr>
<th>l2tpv3</th>
<th>Configures L2TPv3 protocol settings for a profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>logging</td>
<td>Enables L2TPv3 tunnel event logging and debugging. When enabled, all events relating to Ethernet frames to and from bridge VLANs and physical ports on a specified IP address, host or router ID are logged. This option is disabled by default.</td>
</tr>
<tr>
<td>ip-address [IP]</td>
<td>Configures the L2TPv3 peer tunnel IP address for which event logging is enabled. The options are:</td>
</tr>
<tr>
<td>any]</td>
<td>• &lt;IP&gt; – Specify the peer’s IP address. L2TPv3 events are captured and logged for the specified peer.</td>
</tr>
<tr>
<td>hostname [HOSTNAME]</td>
<td>Configures the L2TPv3 peer tunnel hostname for which event logging is enabled. The options are:</td>
</tr>
<tr>
<td>any]</td>
<td>• &lt;HOSTNAME&gt; – Specify the peer’s host name. L2TPv3 events are captured and logged for specified host.</td>
</tr>
<tr>
<td>any]</td>
<td>• any – Peer’s IP address is not specified. Enables event logging for all incoming connections from any IP address.</td>
</tr>
<tr>
<td>router-id [IP]</td>
<td>Configures the L2TPv3 tunnel router ID for which event logging is enabled. The options are:</td>
</tr>
<tr>
<td>any]</td>
<td>• &lt;IP&gt; – Specify the router ID in the IP address format.</td>
</tr>
<tr>
<td>any]</td>
<td>• &lt;WORD&gt; – Specify the router ID in the form of an integer or range. For example 100-200.</td>
</tr>
<tr>
<td>any]</td>
<td>• any – Router ID is not specified. Enables debugging for all incoming connections from any L2TPv3 router.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-profile-default-rfs7000)#l2tpv3 hostname l2tpv3Host1
rfs7000-37FABE(config-profile-default-rfs7000)#l2tpv3 inter-tunnel-bridging
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
  bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier
  ..................................................
  l2tpv3 hostname l2tpv3Host1
  l2tpv3 inter-tunnel-bridging
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands
- no Negates a L2TPv3 tunnel settings on this profile
### 7.1.38 l3e-lite-table

#### Profile Config Commands

Configures L3e lite table aging time

The L3e Lite table stores information about destinations and their location within a specific IPSec tunnel. This enables quicker packet transmissions. The table is updated as nodes transmit packets.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
l3e-lite-table aging-time <10-1000000>
```

**Parameters**
- `l3e-lite-table aging-time <10-1000000>`

<table>
<thead>
<tr>
<th><code>l3e-lite-table aging-time &lt;10-1000000&gt;</code></th>
<th>Configures the aging time in seconds. The aging time defines the duration a learned L3e entry (IP, VLAN) remains in the L3e Lite table before deletion due to lack of activity. The default is 300 seconds.</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000)#l3e-lite-table aging-time 1000
```

```
rfs7000-37FABE(config-profile-default-rfs7000)#show context profile rfs7000 default-rfs7000
bridge vlan 1
  bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier
  ..........................................................
interface ge4
  ip dhcp trust
  qos trust dscp
  qos trust 802.1p
interface pppoe1
  use firewall-policy default
l3e-lite-table aging-time 1000
  --More--
rfs7000-37FABE(config-profile-default-rfs7000)#
```

**Related Commands**

```
no
```

Removes the L3e lite table aging time configuration
7.39 led

Profile Config Commands

Turns on and off access point LEDs

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

led \{flash-pattern\}

Parameters

- led \{flash-pattern\}

Optional. Enables LED flashing on the device using this profile

Select this option to flash an access point's LEDs in a distinct manner (different from its operational LED behavior). Enabling this feature allows an administrator to validate an access point has received its configuration (perhaps remotely at the site of deployment) without having to log into the managing controller or service platform. This feature is disabled by default.

Examples

rfs7000-37FABE(config-profile-RFS7000Test)#led flash-pattern

rfs7000-37FABE(config-profile-RFS7000Test)#show context
profile rfs7000 RFS7000Test
no autoinstall configuration
no autoinstall firmware
led flash-pattern
crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ikev2 policy ikev2-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
crypto ikev1 remote-vpn
crypto ikev2 remote-vpn
crypto auto-ipsec-secure
--More--
rfs7000-37FABE(config-profile-RFS7000Test)#

Related Commands

no

Disables or reverts settings to their default
7.1.40 led-timeout

Profile Config Commands

Configures the LED-timeout timer in the device or profile configuration mode

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
led-timeout [<15-1440>|shutdown]

Parameters
- led-timeout [<15-1440>|shutdown]

Sets the LED-timeout timer. The value provided here determines the interval (time to lapse) for which a device’s LEDs are turned off after the last radio state change. For example, if set at 15 minutes, the LEDs are turned off for 15 minutes after the last radio state change.
- <15-1440> – Specify a value from 15 - 1400 minutes. The default is 30 minutes.
- shutdown – Shuts down the LED-timeout timer. The device LEDs are not turned off.

Examples
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#led-timeout 25

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#show context
nx9000  B4-C7-99-6C-88-09
  use profile default-nx9000
  use rf-domain default
  hostname nx9500-6C8809
  license AAP 66069c24b3bb1259b34ff016c723a9e299dd408f0ff891e7c5f7e279a382648397d6b3e975e356a1 license HTANLT 66069c24b3bb1259eb36826cab3cc83999dd408f0ff891e74b62b2d3594f0b3ddee7967f30e49e497
  no autogen-uniqueid
  ip default-gateway 192.168.13.2
  led-timeout 25
  --More--
  nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#led-timeout shutdown

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#show context
nx9000  B4-C7-99-6C-88-09
  use profile default-nx9000
  use rf-domain default
  hostname nx9500-6C8809
  license AAP 66069c24b3bb1259b34ff016c723a9e299dd408f0ff891e7c5f7e279a382648397d6b3e975e356a1 license HTANLT 66069c24b3bb1259eb36826cab3cc83999dd408f0ff891e74b62b2d3594f0b3ddee7967f30e49e497
  no autogen-uniqueid
  ip default-gateway 192.168.13.2
  led-timeout shutdown
  crypto ikev2 peer IKEv2Peer1
  --More--
  nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables LED-timeout timer</td>
</tr>
</tbody>
</table>
7.1.41 legacy-auto-downgrade

Profile Config Commands

Enables device firmware to auto downgrade when legacy devices are detected

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

legacy-auto-downgrade

Parameters

None

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#legacy-auto-downgrade

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Prevents device firmware from auto downgrading when legacy devices are detected</td>
</tr>
</tbody>
</table>
### 7.1.42 legacy-auto-update

**Profile Config Commands**

Auto updates an AP650 or AP71XX legacy access point firmware

Supported in the following platforms:

- Access Points — AP650, AP7131

**Syntax**

```
legacy-auto-update [ap650|ap71xx image <FILE>]
```

**Parameters**

- `legacy-auto-update [ap650|ap71xx image <FILE>]`

<table>
<thead>
<tr>
<th>legacy-auto-update</th>
<th>Updates a legacy AP650 or AP7131 access point firmware</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap650</td>
<td>Auto updates legacy AP650 firmware</td>
</tr>
<tr>
<td>ap71xx</td>
<td>Auto updates legacy AP7131 firmware</td>
</tr>
<tr>
<td>image &lt;FILE&gt;</td>
<td></td>
</tr>
</tbody>
</table>

- `image` — Sets the path to the firmware image
- `<FILE>` — Specify the path and filename in the flash:/ap.img format.

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000)#legacy-auto-update ap71xx image flash:/ap47d.img
```

**Related Commands**

- `no` — Disables automatic legacy firmware upgrade
7.1.43 lldp

Profile Config Commands

Enables LLDP on this profile and configures LLDP settings

LLDP or IEEE 802.1AB is a vendor-neutral Data Link Layer protocol used by network devices for advertising of (announcing) identity, capabilities, and interconnections on a IEEE 802 LAN network. The protocol is formally referred to by the IEEE as Station and Media Access Control Connectivity Discovery. Both LLDP snooping and ability to generate and transmit LLDP packets is provided.

Information obtained via CDP and LLDP snooping is available in the UI. Information obtained using LLDP is provided during the adoption process, so the layer 2 device detected by the access point can be used as a criteria in the provisioning policy.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

lldp [holdtime|med-tlv-select|run|timer]

lldp [holdtime <10-1800>|run|timer <5-900>]

lldp med-tlv-select [inventory-management|power-management {auto}]

Parameters

- lldp [holdtime <10-1800>|run|timer <5-900>]

<table>
<thead>
<tr>
<th>lldp</th>
<th>Enables LLDP on this profile and configures LLDP settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>holdtime &lt;10-1800&gt;</td>
<td>Sets the holdtime for transmitted LLDP PDUs. This command specifies the time a receiving device holds information before discarding.</td>
</tr>
<tr>
<td></td>
<td>• &lt;10-1800&gt; – Specify a holdtime from 10 - 1800 seconds. The default is 180 seconds.</td>
</tr>
<tr>
<td>run</td>
<td>Enables LLDP on this profile</td>
</tr>
<tr>
<td>timer &lt;5-900&gt;</td>
<td>Sets the transmit interval. This command specifies the transmission frequency of LLDP updates in seconds.</td>
</tr>
<tr>
<td></td>
<td>• &lt;5-900&gt; – Specify transmit interval from 5 - 900 seconds. The default is 60 seconds.</td>
</tr>
</tbody>
</table>

- lldp med-tlv-select [inventory-management|power-management {auto}]

| lldp med-tlv-select [inventory-management|power-management {auto}] | Provides additional media endpoint device TLVs to enable inventory and power management discovery. Specifies the LLDP MED TLVs to send or receive. |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------|
| inventory-management – Enables inventory management discovery. Allows an endpoint to convey detailed inventory information about itself. This information includes details, such as manufacturer, model, and software version, etc. This option is enabled by default. |
| power-management auto – Enables extended power via MDI discovery. Allows endpoints to convey power information, such as how the device is powered, power priority, etc. |
| • auto – Optional. Assigns default value based on device type |
Examples
rfs7000-37FABE(config-profile-default-rfs7000)#lldp timer 20
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
  use firewall-policy default
  ip dns-server-forward
  ip nat pool pool1
  address range 172.16.10.2 172.16.10.8
  ip nat inside source list test interface vlan1 pool pool1 overload
  lldp timer 20
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

<table>
<thead>
<tr>
<th>command</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables LLDP on this profile</td>
</tr>
</tbody>
</table>
### 7.1.44 load-balancing

#### Profile Config Commands

Configures load balancing parameters

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

load-balancing [advanced-params|balance-ap-loads|balance-band-loads|
  balance-channel-loads|band-control-startegy|band-ratio|group-id|neighbor-selection-
  strategy]

load-balancing advanced-params [2.4GHz-load|5GHz-load|ap-load|equality-margin|
  hiwater-threshold|max-neighbors|max-preferred-band-load|min-common-clients|
  min-neighbor-rssi|min-probe-rssi]

load-balancing advanced-params [2.4GHz-load|5GHz-load|ap-load] [client-weightage|
  throughput-weightage] <0-100>
load-balancing advanced-params equality-margin [2.4GHz|5GHz|ap|band] <0-100>
load-balancing advanced-params hiwater-threshold [ap|channel-2.4GHz|channel-5GHz] <0-100>
load-balancing advanced-params max-preferred-band-load [2.4GHz|5GHz] <0-100>
load-balancing advanced-params [max-neighbors <0-16]|min-common-clients <0-256>|
  min-neighbor-rssi <-100-30>|min-probe-rssi <-100-30>

load-balancing [balance-ap-loads|balance-band-loads|balance-channel-loads [2.4GHz|
  5GHz]]

load-balancing band-control-strategy [distribute-by-ratio|prefer-2.4GHz|prefer-5GHz]
load-balancing band-ratio [2.4GHz|5GHz] [0|<1-10>]
load-balancing group-id <GROUP-ID>
load-balancing neighbor-selection-strategy [use-common-clients|use-roam-notification|
  use-smart-rf]

#### Parameters

- load-balancing advanced-params [2.4GHz-load|5GHz-load|ap-load] [client-weightage|
  throughput-weightage] <0-100>

<table>
<thead>
<tr>
<th>load-balancing advanced-params</th>
<th>Configures advanced load balancing parameters</th>
</tr>
</thead>
</table>
| 2.4GHz-load [client-weightage| throughput-weightage] <0-100> | Configures 2.4 GHz load calculation weightages
  • client-weightage – Specifies weightage assigned to the client-count when calculating the 2.4 GHz load
  • throughput-weightage – Specifies weightage assigned to throughput, when calculating the 2.4 GHz load
  The following keyword is common to the ‘client-weightage’ and ‘throughput-weightage’ parameters:
  • <0-100> – Sets the margin as a load percentage from 1 - 100. The default client-weightage is 90%. The default throughput-weightage is 10%. |
### 5GHz-load

```
[client-weightage throughput-weightage] <0-100>
```

Configures 5.0 GHz load calculation weightages
- `client-weightage` – Specifies weightage assigned to the client-count when calculating the 5.0 GHz load
- `throughput-weightage` – Specifies weightage assigned to throughput, when calculating the 5.0 GHz load

The following keyword is common to the ‘client-weightage’ and ‘throughput-weightage’ parameters:
- `<0-100>` – Sets the margin as a load percentage from 1 - 100. The default client-weightage is 90%. The default throughput-weightage is 10%.

### ap-load

```
[client-weightage throughput-weightage] <0-100>
```

Configures AP load calculation weightages
- `client-weightage` – Specifies weightage assigned to the client-count, when calculating the AP load
- `throughput-weightage` – Specifies weightage assigned to throughput, when calculating the AP load

The following keyword is common to the ‘client-weightage’ and ‘throughput-weightage’ parameters:
- `<0-100>` – Sets the margin as a load percentage from 1 - 100. The default client-weightage is 90%. The default throughput-weightage is 10%.

### load-balancing advanced-params equality-margin

```
[2.4GHz|5GHz|ap|band] <0-100>
```

Configures the maximum load difference considered equal. The load is compared for different 2.4 GHz channels, 5.0 GHz channels, APs, or bands.
- `2.4GHz` – Configures the maximum load difference considered equal when comparing loads on different 2.4 GHz channels
- `5GHz` – Configures the maximum load difference considered equal when comparing loads on different 5.0 GHz channels
- `ap` – Configures the maximum load difference considered equal when comparing loads on different APs
- `band` – Configures the maximum load difference considered equal when comparing loads on different bands

The following keyword is common to 2.4 GHz channels, 5.0 GHz channels, APs, and bands:
- `<0-100>` – Sets the margin as a load percentage from 1 - 100. The default equality-margin for 2.5 GHz, 5.0 GHz, ap, and band loads is 1%.

### load-balancing advanced-params hiwater-threshold

```
[ap|channel-2.4GHz|channel-5GHz] <0-100>
```

Configures the load beyond which load balancing is invoked
- `ap` – Configures the AP load beyond which load balancing begins
- `channel-2.4GHz` – Configures the AP load beyond which load balancing begins (for APs on 2.4 GHz channel)

Contd..
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>**load-balancing advanced-params max-preferred-band-load [2.4GHz</td>
<td>5GHzd] &lt;0-100&gt;**</td>
</tr>
<tr>
<td><strong>load-balancing advanced-params</strong></td>
<td>Configures advanced load balancing parameters</td>
</tr>
<tr>
<td><strong>max-neighbors &lt;0-16&gt;</strong></td>
<td>Configures the maximum number of confirmed neighbors to balance • &lt;0-16&gt; – Specify a value from 0 - 16. Optionally configure a minimum of 0 neighbors and a maximum of 16 neighbors. The default is 16.</td>
</tr>
<tr>
<td><strong>min-common-clients &lt;0-256&gt;</strong></td>
<td>Configures the minimum number of common clients that can be shared with the neighbor for load balancing • &lt;0-256&gt; – Specify a value from 0 - 256. Optionally configure a minimum of 0 clients and a maximum of 256 clients. The default is 0.</td>
</tr>
<tr>
<td><strong>min-neighbor-rssi &lt;-100-30&gt;</strong></td>
<td>Configures the minimum signal strength (RSSI) of a neighbor detected • &lt;-100-30&gt; – Sets the signal strength in dBm. Specify a value from -100 - 30 dBm. The default is -65 dBm.</td>
</tr>
<tr>
<td><strong>min-probe-rssi &lt;-100-30&gt;</strong></td>
<td>Configures the minimum received probe signal strength required to qualify the sender as a common client • &lt;0-100&gt; – Sets the signal strength in dBm. Specify a value from -100 - 30 dBm. The default is -100 dBm.</td>
</tr>
<tr>
<td><strong>load-balancing balance-ap-loads</strong></td>
<td>Enables neighbor AP load balancing. This option distributes the access point's radio load amongst other controller managed access point radios. This option is disabled by default.</td>
</tr>
<tr>
<td><strong>load-balancing balance-band-loads</strong></td>
<td></td>
</tr>
<tr>
<td><strong>load-balancing balance-channel-loads</strong></td>
<td></td>
</tr>
<tr>
<td>**load-balancing [balance-ap-loads</td>
<td>balance-band-loads</td>
</tr>
<tr>
<td><strong>channel-5GHz</strong></td>
<td>Configures the AP load beyond which load balancing begins for (APs on 5.0 GHz channel)</td>
</tr>
<tr>
<td><strong>load-balancing advanced-params</strong></td>
<td></td>
</tr>
<tr>
<td><strong>max-preferred-band-load</strong></td>
<td>Configures the maximum load on the preferred band, beyond which the other band is equally preferred. The following keyword is common for the 'AP', 'channel-2.4GHz', and 'channel-5GHz' parameters: • &lt;0-100&gt; – Sets the load threshold as a number from 1 - 100. The default hiwater-threshold for channel-2.5GHz, channel-5GHz, and ap loads is 5.</td>
</tr>
<tr>
<td>**load-balancing advanced-params [max-neighbors &lt;0-16&gt;</td>
<td>min-common-clients &lt;0-256&gt;</td>
</tr>
<tr>
<td>**load-balancing [balance-ap-loads</td>
<td>balance-band-loads</td>
</tr>
<tr>
<td><strong>balance-ap-loads</strong></td>
<td>Enables neighbor AP load balancing. This option distributes the access point's radio load amongst other controller managed access point radios. This option is disabled by default.</td>
</tr>
<tr>
<td><strong>balance-band-loads</strong></td>
<td></td>
</tr>
<tr>
<td><strong>balance-channel-loads</strong></td>
<td></td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>balance-band-loads</td>
<td>Enables balancing of the total band load amongst neighbors. This option balances the access point’s radio load by assigning a ratio to both the 2.4 GHz and 5.0 GHz bands. Balancing radio load by band ratio allows an administrator to assign a greater weight to radio traffic on either the 2.4 GHz or 5.0 GHz band. This option is disabled by default.</td>
</tr>
<tr>
<td>load-balancing band-control-strategy [distribute-by-ratio</td>
<td>prefer-2.4GHz</td>
</tr>
<tr>
<td>balance-channel-loads [2.4GHz</td>
<td>5GHz]</td>
</tr>
<tr>
<td>load-balancing band-ratio [2.4GHz</td>
<td>5GHz] [0</td>
</tr>
<tr>
<td>distribute-by-ratio</td>
<td>Distributes clients to either band according to the band-ratio</td>
</tr>
<tr>
<td>prefer-2.4GHz</td>
<td>Nudges all dual-band clients to 2.4 GHz band</td>
</tr>
<tr>
<td>prefer-5GHz</td>
<td>Nudges all dual-band clients to 5.0 GHz band. This is the default setting.</td>
</tr>
<tr>
<td>load-balancing group-id &lt;GROUP-ID&gt;</td>
<td>Configures group ID to facilitate load balancing&lt;br&gt;• &lt;GROUP-ID&gt; – Specify the group ID. This option is enabled only when a group ID is configured.</td>
</tr>
</tbody>
</table>
### load-balancing neighbor-selection-strategy [use-common-clients|use-roam-notification|use-smart-rf]

<table>
<thead>
<tr>
<th>load-balancing neighbor-selection-strategy</th>
<th>Configures a neighbor selection strategy. The options are: use-common-clients, use-roam-notification, and use-smart-rf</th>
</tr>
</thead>
<tbody>
<tr>
<td>use-common-clients</td>
<td>Selects neighbors based on probes from clients common to neighbors. This option is enabled by default.</td>
</tr>
<tr>
<td>use-roam-notification</td>
<td>Selects neighbors based on roam notifications from roamed clients. This option is enabled by default.</td>
</tr>
<tr>
<td>use-smart-rf</td>
<td>Selects neighbors detected by Smart RF. This option is enabled by default.</td>
</tr>
</tbody>
</table>

#### Examples

```bash
rfs7000-37FABE(config-profile-default-rfs7000)#load-balancing advanced-params 2.4ghz-load throughput-weightage 90
rfs7000-37FABE(config-profile-default-rfs7000)#load-balancing advanced-params hiwater-threshold ap 90
rfs7000-37FABE(config-profile-default-rfs7000)#load-balancing balance-ap-loads
rfs7000-37FABE(config-profile-default-rfs7000)#show context profile rfs7000 default-rfs7000
  bridge vlan 1
  bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier
  ip default-gateway 172.16.10.4
  autoinstall configuration
  autoinstall firmware
  load-balancing advanced-params 2.4ghz-load throughput-weightage 90
  load-balancing advanced-params hiwater-threshold ap 90
  load-balancing balance-ap-loads
  --More--
rfs7000-37FABE(config-profile-default-rfs7000)#s
```

#### Related Commands

| **no** | Disables load balancing on this profile |
### 7.1.45 logging

**Profile Config Commands**

Enables message logging and configures logging settings. When enabled, the profile logs individual system events to a user-defined log file or a syslog server. Message logging is disabled by default.

Enabling message logging is recommended, because system event logs can be analyzed to determine an overall pattern that may be negatively impacting performance.

This command can also be executed in the device configuration mode.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
logging [aggregation-time|buffered|console|facility|forward|host|on|syslog]
logging [aggregation-time <1-60>|host [IPv4|IPv6] {port <1-65535}>|on]
logging [buffered|console|syslog|forward] [level [emergencies|alerts|critical|errors|warnings|notifications|informational|debugging]]
logging facility [local0|local1|local2|local3|local4|local5|local6|local7]
```

**Parameters**

- **aggregation-time**
  - <1-60> — Sets the number of seconds for aggregating repeated messages. This is the interval at which system events are logged on behalf of this profile. The shorter the interval, the sooner the event is logged.
  - The default value is 0.

- **host**
  - IPv4|IPv6 — Configures a remote host to receive log messages. Defines numerical (non DNS) IPv4 or IPv6 addresses for external resources where logged system events can be sent on behalf of the profile (or device). A maximum of four entries can be made.
  - Port — Specify the syslog port.

- **on**
  - Enables the logging of system messages

- **buffered**
  - Enables message logging and configures logging settings

- **console**
  - Sets the buffered logging level

- **syslog**
  - Sets the syslog server’s logging level

- **forward**
  - Forwards system debug messages to the wireless controller or service platform
The following keywords are common to the buffered, console, syslog, and forward parameters.
All incoming messages have different severity levels based on their importance. The severity level is fixed on a scale of 0 - 7.
- `<0-7>` – Sets the message logging severity level on a scale of 0 - 7
- `emergencies` – Severity level 0: System is unusable
- `alerts` – Severity level 1: Requires immediate action
- `critical` – Severity level 2: Critical conditions
- `errors` – Severity level 3: Error conditions
- `warnings` – Severity level 4: Warning conditions (default)
- `notifications` – Severity level 5: Normal but significant conditions
- `informational` – Severity level 6: Informational messages
- `debugging` – Severity level 7: Debugging messages

`logging facility [local0|local1|local2|local3|local4|local5|local6|local7]`

- `logging facility` Enables message logging and configures logging settings
  - `facility [local0|local1|local2|local3|local4|local5|local6|local7]` Enables the syslog to decide where to send the incoming message. There are 8 logging facilities, from syslog0 to syslog7.
    - `local0` – Syslog facility local0
    - `local1` – Syslog facility local1
    - `local2` – Syslog facility local2
    - `local3` – Syslog facility local3
    - `local4` – Syslog facility local4
    - `local5` – Syslog facility local5
    - `local6` – Syslog facility local6
    - `local7` – Syslog facility local7

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#logging facility local4

rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
  ...................................................
  ip dns-server-forward
  ip nat pool pooll
    address range 172.16.10.2 172.16.10.8
  ip nat inside source list test interface vlan1 pool pooll overload
  lldp timer 20
  service pm sys-restart
  router ospf
  l2tpv3 hostname l2tpv3Host1
  l2tpv3 inter-tunnel-bridging
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

| `no` | Disables logging on this profile |
7.1.46 mac-address-table

Profile Config Commands

Configures the MAC address table. Use this command to create MAC address table entries by assigning a static address to the MAC address table.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```plaintext
mac-address-table [aging-time|detect-gateways|static]
mac-address-table aging-time [0|<10-1000000>]
mac-address-table detect-gateways
mac-address-table static <MAC> vlan <1-4094> interface [<L2-INTERFACE>|ge <1-4>|port-channel <1-2>]
```

Parameters

- **mac-address-table aging-time [0|<10-1000000>]**
  - Sets the duration a learned MAC address persists after the last update
    - **0** – Entering the value ‘0’ disables the aging time
    - **<10-1000000>** – Sets the aging time from 10 - 1000000 seconds. The default is 300 seconds.

- **mac-address-table detect-gateways**
  - Enables automatic detection of gateways. Detected gateways are remembered in the MAC address table.

- **mac-address-table static <MAC> vlan <1-4094> interface [<L2-INTERFACE>|ge <1-4>|port-channel <1-2>]**
  - Creates a static MAC address table entry
    - **<MAC>** – Specifies the static address to add to the MAC address table. Specify the MAC address in the AA-BB-CC-DD-EE-FF, AA:BB:CC:DD:EE:FF, or AABB.CCDD.EEFF format.
    - **vlan <1-4094>** – Assigns a static MAC address to a specified VLAN port
      - **<1-4094>** – Specify the VLAN index from 1 - 4094.
    - **interface [<L2-INTERFACE>|ge <1-4>|port-channel <1-2>]** – Specifies the interface type. The options are: layer 2 Interface, GigabitEthernet interface, and a port channel interface
      - **<L2-INTERFACE>** – Specify the layer 2 interface name.
      - **ge** – Specifies a GigabitEthernet interface
        - **<1-4>** – Specify the GigabitEthernet interface index from 1 - 4.
      - **port-channel** – Specifies a port channel interface
        - **<1-2>** – Specify the port channel interface index from 1 - 2.
Examples

rfs7000-37FABE(config-profile-default-rfs7000)#mac-address-table static 00-40-96-B0-BA-2A vlan 1 interface ge 1

rfs7000-37FABE(config-profile-default-rfs7000)#show context profile rfs7000 default-rfs7000
bridge vlan 1
..........................................................
logging facility local4
mac-address-table static 00-40-96-B0-BA-2A vlan 1 interface ge1
ip nat pool pool1
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

| no | Disables or reverts settings to their default |
7.1.47 mac-auth

Profile Config Commands

Enables authentication of a client's MAC address on wired ports. When configured, MAC authentication will be enabled on devices using this profile.

To enable MAC address authentication on a device, enter the device’s configuration mode and execute the `mac-auth` command.

When enabled, the source MAC address of a device, connected to the specified wired port, is authenticated with the RADIUS server. Once authenticated the device is permitted access to the managed network and packets from the authenticated source are processed. If not authenticated the device is either denied access or provided guest access through the guest VLAN (provided guest VLAN access is configured on the port).

Enabling MAC authentication requires you to first configure a AAA policy specifying the RADIUS server. Configure the client's MAC address on the specified RADIUS server. Attach this AAA policy to a profile or a device. Finally, enable MAC authentication on the desired wired port of the device or device-profile.

Only one MAC address is supported for every wired port. Consequently, when one source MAC address is authenticated, packets from all other sources are dropped.

To enable client MAC authentication on a wired port:

1. Configure the user on the RADIUS server. The following examples create a RADIUS server user entry.
   a. `<DEVICE>(config)#radius-group <RAD-GROUP-NAME>`
      `<DEVICE>(config-radius-group-<RAD-GROUP-NAME>)#policy vlan <VLAN-ID>`
   b. `<DEVICE>(config)#radius-user-pool-policy <RAD-USER-POOL-NAME>`
      `<DEVICE>(config-radius-user-pool-<RAD-USER-POOL-NAME>)#user <USER-NAME> password <PASSWORD> group <RAD-GROUP-OF-STEP-A>`
      Note: The `<USER-NAME>` and `<PASSWORD>` should be the client's MAC address. This address will be matched against the MAC address of incoming traffic at the specified wired port.
   c. `<DEVICE>(config)#radius-server-policy <RAD-SERVER-POL-NAME>`
      `<DEVICE>(config-radius-server-policy-<RAD-SERVER-POL-NAME>)#use radius-user-pool-policy <RAD-USER-POOL-OF-STEP-B>`

2. Configure a AAA policy exclusively for wired MAC authentication and specify the authentication (RADIUS) server settings. The following example creates a AAA policy ‘macauth’ and enters its configuration mode:
   `<DEVICE-A>(config)#aaa-policy macauth
   <DEVICE-A>(config-aaa-policy-macauth)#...`  
   Specify the RADIUS server details.
   `<DEVICE-A>(config)#aaa-policy macauth
   <DEVICE-A>(config-aaa-policy-macauth)#authentication server <1-6> [host <IP>|onboard]`  
   Attach the AAA policy to the device or profile. When attached to a profile, the AAA policy is applied to all devices using this profile.
   `<DEVICE>(config-device-aa-bb-cc-dd-ee)#mac-auth use aaa-policy macauth
   <DEVICE>(config-profile-<DEVICE-PROFILE-NAME>)#mac-auth use aaa-policy macauth`

3. Enable mac-auth on the device’s desired GE port. When enabled on a profile, MAC address authentication is enabled, on the specified GE port, of all devices using this profile.
   `<DEVICE>(config-device-aa-bb-cc-dd-ee)#interface ge x
   <DEVICE>(config-device-aa-bb-cc-dd-ee-gex)#mac-auth
   `<DEVICE>(config-profile-<PROFILE-NAME>)#interface ge x
   `<DEVICE>(config-profile-<PROFILE-NAME>)#mac-auth`
Supported in the following platforms:
  • Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax
mac-auth use aaa-policy <AAA-POLICY-NAME>

Parameters
  • mac-auth use aaa-policy <AAA-POLICY-NAME>

<table>
<thead>
<tr>
<th>mac-auth</th>
<th>Enables 802.1X authentication of MAC addresses on this profile. Use the device configuration mode to enable this feature on a device.</th>
</tr>
</thead>
</table>
| use aaa-policy <AAA-POLICY-NAME> | Associates an existing AAA policy with this profile (or device)  
  • <AAA-POLICY NAME> – Specify the AAA policy name.  
The AAA policy used should be created especially for MAC authentication. |

Examples
The following examples demonstrate the configuration of authentication of MAC addresses on wired ports:
rfs4000-229D58(config-aaa-policy-mac-auth)#authentication server 1 onboard controller
rfs4000-229D58(config-aaa-policy-mac-auth)#show context
  authentication server 1 onboard controller
rfs4000-229D58(config-aaa-policy-mac-auth)#

rfs4000-229D58(config)#radius-group RG
rfs4000-229D58(config-radius-group-RG)#policy vlan 11

rfs4000-229D58(config-radius-group-RG)#show context
  radius-group RF
  policy vlan 11
rfs4000-229D58(config-radius-group-RG)#

rfs4000-229D58(config)#radius-user-pool-policy RUG
rfs4000-229D58(config-radius-user-pool-RUG)#user 00-16-41-55-F8-5D password 0 00-16-41-55-F8-5D group RG

rfs4000-229D58(config-radius-user-pool-RUG)#show context
  radius-user-pool-policy RUG
  user 00-16-41-55-F8-5D password 0 00-16-41-55-F8-5D group RG
rfs4000-229D58(config-radius-user-pool-RUG)#

rfs4000-229D58(config)#radius-server-policy RS
rfs4000-229D58(config-radius-server-policy-RS)#use radius-user-pool-policy RUG

rfs4000-229D58(config-radius-server-policy-RS)#show context
  radius-server-policy RS
  use radius-user-pool-policy RUG
rfs4000-229D58(config-radius-server-policy-RS)#

rfs4000-229D58(config-device-00-23-68-22-9D-58-if-ge4)#show context
  interface ge4
  dot1x authenticator host-mode single-host
  dot1x authenticator port-control auto
  mac-auth
rfs4000-229D58(config-device-00-23-68-22-9D-58-if-ge4)#
rfs4000-229D58(config-device-00-23-68-22-9D-58-if-ge5)#show context
    interface ge5
    switchport mode access
    switchport access vlan 1
    dot1x authenticator host-mode single-host
    dot1x authenticator guest-vlan 5
    dot1x authenticator port-control auto
    mac-auth
rfs4000-229D58(config-device-00-23-68-22-9D-58-if-ge5)#

rfs4000-229D58(config-device-00-23-68-22-9D-58)#show macauth interface ge 4
Mac Auth info for interface GE4
-----------------------------------
  Mac Auth Enabled
  Mac Auth Authorized
  Client MAC 00-16-41-55-F8-5D
rfs4000-229D58(config-device-00-23-68-22-9D-58)#

rfs4000-229D58(config-device-00-23-68-22-9D-58)#show macauth interface ge 5
Mac Auth info for interface GE5
-----------------------------------
  Mac Auth Enabled
  Mac Auth Not Authorized
rfs4000-229D58(config-device-00-23-68-22-9D-58)#

Related Commands

<table>
<thead>
<tr>
<th>command</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables authentication of MAC addresses on wired ports settings on this profile (or device)</td>
</tr>
</tbody>
</table>
### 7.1.48 management-server

**Profile Config Commands**

Configures a management server with this profile. This command is also applicable to the device configuration context.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
management-server <HOST-NAME> port <1-65535>
```

**Parameters**

- `management-server <HOST-NAME> port <1-65535>`

**Examples**

```
rfs6000-6DB5D4 (config-profile-testRFS6000)#management-server nx9500-6C8809 port 300
rfs6000-6DB5D4 (config-profile-testRFS6000)#show context include-factory | include management-server
management-server nx9500-6C8809 port 300
rfs6000-6DB5D4 (config-profile-testRFS6000)#
```

**Related Commands**

- `no` Removes the management server configuration
**7.1.49 memory-profile**

*Profile Config Commands*

Configures memory profile used on the device

Supported in the following platforms:

- Access Points — AP621, AP6511, AP6521

**Syntax**

`memory-profile [adopted|standalone]`

**Parameters**

- `memory-profile [adopted|standalone]`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>memory-profile</td>
<td>Configures memory profile used on the device</td>
</tr>
<tr>
<td>adopted</td>
<td>Configures adopted mode (no GUI and higher MiNT routes, firewall flows)</td>
</tr>
<tr>
<td>standalone</td>
<td>Configures standalone mode (GUI and fewer MiNT routes, firewall flows)</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile-testAP6511)#memory-profile adopted
Note: memory-profile change will take effect after device reboot
nx9500-6C8809(config-profile-testAP6511)#
```

**Related Commands**

- `no` Resets device's memory profile configuration
### 7.1.50 meshpoint-device

#### Profile Config Commands

Configures meshpoint device parameters. This feature is configurable in the profile and device configuration modes.

Supported in the following platforms:

- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533

#### Syntax

```
meshpoint-device <MESHPOINT-NAME>
```

#### Parameters

- `meshpoint-device <MESHPOINT-NAME>`

<table>
<thead>
<tr>
<th>meshpoint-device &lt;MESHPOINT-NAME&gt;</th>
<th>Configures meshpoint device parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;MESHPOINT-NAME&gt; – Specify meshpoint name.</td>
</tr>
</tbody>
</table>

#### Usage Guidelines

For Vehicular Mounted Modem (VMM) access points or other mobile devices, set the path selection method as mobile-snr-leaf in the config-meshpoint-device mode. For more information, see `path-method`.

#### Examples

```
rfs7000-37FABE(config-profile-testAP71XX)#meshpoint-device test
```

```
rfs7000-37FABE(config-profile-testAP71XX-meshpoint-test)#?
Mesh Point Device Mode commands:
    acs          Configure auto channel selection parameters
    exclude      Exclude neighboring Mesh Devices
    hysteresis   Configure path selection SNR hysteresis values
    monitor      Event Monitoring
    no           Negate a command or set its defaults
    path-method  Path selection method used to find a root node
    preferred    Configure preferred path parameters
    root         Set this meshpoint as root
    root-select  Root selection method parameters
    clrscr       Clears the display screen
    commit       Commit all changes made in this session
    do           Run commands from Exec mode
    end          End current mode and change to EXEC mode
    exit         End current mode and down to previous mode
    help         Description of the interactive help system
    revert       Revert changes
    service      Service Commands
    show         Show running system information
    write        Write running configuration to memory or terminal
```

```
rfs7000-37FABE(config-profile-testAP71XX-meshpoint-test)#
```

#### Related Commands

```
no
```

Removes a specified meshpoint

#### NOTE:

For more information on the meshpoint-device configuration parameters, see *Chapter 26, MESHPOINT*. 

---
7.1.51 meshpoint-monitor-interval

Profile Config Commands

Configures the meshpoint monitoring interval. This is the interval, in seconds, at which the meshpoint status is checked.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

meshpoint-monitor-interval <1-65535>

Parameters

- meshpoint-monitor-interval <1-65535>

<table>
<thead>
<tr>
<th>meshpoint-monitor-interval &lt;1-65535&gt;</th>
<th>Configures the meshpoint monitoring interval in seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-65535&gt;</td>
<td>Specify the interval from 1 - 65535 seconds. The default is 30 seconds.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#meshpoint-monitor-interval 100

rfs7000-37FABE(config-profile-default-rfs7000)#show context profile rfs7000 default-rfs7000
bridge vlan 1
  bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier
meshpoint-monitor-interval 100
ip default-gateway 172.16.10.4
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

| no | Resets the meshpoint monitoring interval to default (30 seconds) |
### 7.1.52 min-misconfiguration-recovery-time

**Profile Config Commands**

Configures the minimum device connectivity verification time

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
min-misconfiguration-recovery-time <60-3600>
```

**Parameters**

- `min-misconfiguration-recovery-time <60-3600>`

| min-misconfiguration-recovery-time <60-3600> | Configures the minimum connectivity (with the associated device) verification interval
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60-3600&gt;</td>
<td>Specify a value from 60 - 3600 seconds (default is 60 seconds).</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile-testRFS4000)#min-misconfiguration-recovery-time 500

nx9500-6C8809(config-profile-testRFS4000)#show context
profile rfs4000 testRFS4000
meshpoint-monitor-interval 300
no autoinstall configuration
no autoinstall firmware
crypto ikev1 policy ikev1-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ikev2 policy ikev2-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
crypto ikev1 remote-vpn
crypto ikev2 remote-vpn
crypto auto-ipsec-secure
crypto remote-vpn-client
interface radio1
interface radio2
interface up1
interface ge1
interface ge2
interface ge3
interface ge4
interface ge5
interface wwan1
interface pppoe1
use firewall-policy default
min-misconfiguration-recovery-time 500
service pm sys-restart
router ospf
router bgp
```

**Related Commands**

| no | Resets setting to default (60 seconds) |
7.1.53 mint

Profile Config Commands

Configures MiNT protocol parameters required for MiNT creation and adoption

MiNT links are required for adoption of a device (APs, wireless controller, and service platform) to a controller. The MiNT link is created on both the adoptee and the adopter. WiNG provides several commands to configure MiNT links and establish adoption for both IPv4 and IPv6 addresses.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
mint [dis|inter-tunnel-bridging|level|link|mlcp|rate-limit|spf-latency|
  tunnel-across-extended-vlan|tunnel-controller-load-balancing]
```

```
mint dis [priority-adjustment <-255-255>|strict-evis-reachability]
mint inter-tunnel-bridging
```

```
mint level 1 area-id [<1-16777215>|<NUMBER-ALIAS-NAME>]
mint link [force|ip|listen|vlan]
mint link force ip [<IPv4>|<IPv6>] [<1-65535>|level 2|level 2] {adjacency-hold-time <2-600>|cost <1-10000>|hello-interval <1-120>|ipsec-secure {gw [<IP>|<HOST-NAME>]}}
mint link ip [<IPv4>|<IPv6>|<HOST-ALIAS-NAME>] {<1-65535>|adjacency-hold-time <2-600>|cost <1-10000>|hello-interval <1-120>|ipsec-secure {gw [<IP>|<HOST-NAME>]}|level [1|2]}
mint mlcp [ip|ipv6|vlan]
mint rate-limit level2 [link|mlcp]
  {mlcp [ip|ipv6|vlan]] rate <50-1000000> max-burst-size <2-1024>
  {red-threshold [background|best-effort|video|voice] <0-100}}
mint spf-latency <0-60>
mint tunnel-across-extended-vlan
mint tunnel-controller-load-balancing level1
```

Parameters

- mint dis [priority-adjustment <-255-255>|strict-evis-reachability]

<table>
<thead>
<tr>
<th>mint</th>
<th>Configures MiNT protocol parameters required for MiNT link creation and adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td>dis priority-adjustment &lt;-255-255&gt;</td>
<td>Sets the relative priority for the router to become DIS (designated router)</td>
</tr>
<tr>
<td></td>
<td>• priority-adjustment – Sets priority adjustment added to base priority</td>
</tr>
<tr>
<td></td>
<td>The Designated IS (DIS) priority adjustment is the value added to the base level DIS priority to influence the DIS election. A value of +1 or greater increases DISiness.</td>
</tr>
<tr>
<td></td>
<td>• &lt;-255-255&gt; – Specify a value from -255 - 255. The default is 0.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Higher numbers result in higher priorities</td>
</tr>
<tr>
<td>strict-evis-reachability</td>
<td>Enables reaching <em>Ethernet Virtualization Interconnect</em> (EVIS) election winners through MiNT. This option is enabled by default.</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>mint</strong> inter-tunnel-bridging</td>
<td>Configures MiNT protocol parameters required for MiNT link creation, adoption and communication</td>
</tr>
<tr>
<td><strong>mint</strong> inter-tunnel-bridging</td>
<td>Enables forwarding of broadcast multicast (BCMC) packets between devices communicating via Level 2 MiNT links. When enabled, MiNT tunnels across Level 2, adopted access points are bridged. One of the advantages of inter-tunnel bridging is the enabling of roaming between these access points. This option is disabled by default. <strong>Note:</strong> If enabling this option, use ACLs to filter unwanted BCMC traffic.</td>
</tr>
<tr>
<td><strong>mint</strong> level 1 area-id [&lt;1-16777215&gt;</td>
<td>&lt;NUMBER-ALIAS-NAME&gt;]</td>
</tr>
<tr>
<td><strong>mint</strong> level 1 area-id</td>
<td>Specifies the level 1 routing area identifier. Use one of the following options to specify the area ID:</td>
</tr>
<tr>
<td>• &lt;1-16777215&gt; – Specify a value from 1 - 16777215.</td>
<td></td>
</tr>
<tr>
<td>• &lt;NUMBER-ALIAS-NAME&gt; – Specify a number alias (should be existing and configured). Aliases are configuration items that can be defined once and used in different configuration contexts. For more information on creating a number alias, see alias.</td>
<td></td>
</tr>
<tr>
<td><strong>mint</strong> link force ip [&lt;IPv4&gt;</td>
<td>&lt;IPv6&gt;] [&lt;1-65535&gt; level 2] {adjacency-hold-time &lt;2-600&gt;</td>
</tr>
<tr>
<td><strong>mint</strong> link force</td>
<td>Creates a MiNT routing link as a forced link</td>
</tr>
<tr>
<td>• force – Forces a MiNT routing link to be created even if not necessary</td>
<td></td>
</tr>
<tr>
<td><strong>ip</strong> [&lt;IPv4&gt;</td>
<td>&lt;IPv6&gt;]</td>
</tr>
<tr>
<td>Use this keyword to specify the IP address (IPv4 or IPv6) used by peers for inter-operation when supporting the MiNT protocol.</td>
<td></td>
</tr>
<tr>
<td>• &lt;IPv4&gt; – Specify the MiNT tunnel peer’s IPv4 address.</td>
<td></td>
</tr>
<tr>
<td>• &lt;IPv6&gt; – Specify the MiNT tunnel peer’s IPv6 address.</td>
<td></td>
</tr>
<tr>
<td>After specifying the MiNT peer’s address, configure the following MiNT link parameters: UDP port, adjacency-hold-time, cost, hello-interval, IPSec security gateway, and routing level.</td>
<td></td>
</tr>
<tr>
<td><strong>&lt;1-65535&gt; level 2</strong></td>
<td>Optional. Specifies a custom UDP port for MiNT links. Specify the port from 1 - 65535.</td>
</tr>
<tr>
<td>• level – Specifies the routing level</td>
<td></td>
</tr>
<tr>
<td>• 2 – Configures level 2 inter-site MiNT routing</td>
<td></td>
</tr>
<tr>
<td><strong>adjacency-hold-time &lt;2-600&gt;</strong></td>
<td>Optional. Specifies the adjacency lifetime after hello packets cease</td>
</tr>
<tr>
<td>• &lt;2-600&gt; – Specify a value from 2 - 600 seconds. The default is 46 seconds.</td>
<td></td>
</tr>
<tr>
<td><strong>cost &lt;1-100000&gt;</strong></td>
<td>Optional. Specifies the link cost in arbitrary units</td>
</tr>
<tr>
<td>• &lt;1-100000&gt; – Specify a value from 1 - 100000. The default is 100.</td>
<td></td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>hello-interval &lt;1-120&gt;</td>
<td>Optional. Specifies the interval, in seconds, between successive hello packets</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-120&gt; – Specify a value from 1 - 120 seconds. The default is 15 seconds.</td>
</tr>
</tbody>
</table>

| ipsec-security {gw [<IP>|<HOST-NAME>]}     | Optional. Enables IPSec secure peer authentication on the MiNT link connection (link). This option is disabled by default. |
|                                             | • gw [<IP>|<HOSTNAME>] – Optional. Configures the IPSec secure gateway. When enabling IPSec, you can optionally specify the IPSec secure gateway’s numerical IP address or administrator defined hostname. |


- mint
  Configures MiNT protocol parameters required for MiNT link creation and adoption

- link listen ip [<IPv4>|<IPv6>|<HOST-ALIAS-NAME>]
  Creates a MiNT routing link
  • listen – Creates a MiNT listening link
  • ip – Creates a MiNT listening link over UDP/IP or IPv6
    • <IPv4> – Specify the IPv4 address of the listening UDP/IP link.
    • <IPv6> – Specify the IPv6 address of the listening UDP/IP link.
    • <HOST-ALIAS-NAME> – Specify the host alias identifying the MiNT link address. The host alias should exist and be configured.

- link vlan <1-4094>
  Enables MiNT routing on VLAN
  • vlan – Defines a VLAN ID used by peers for inter-operation when supporting the MiNT protocol.
    • <1-4094> – Select VLAN ID from 1 - 4094.

- adjacency-hold-time <2-600>
  This parameter is common to the ‘listen’ and ‘vlan’ parameters:
  • adjacency-hold-time <2-600> – Optional. Specifies the adjacency lifetime after hello packets cease
    • <2-600> – Specify a value from 2 - 600 seconds. The default is 46 seconds.
  **Note:** For MiNT VLAN routing the default is 13 seconds.

- cost <1-100000>
  This parameter is common to the ‘listen’ and ‘vlan’ parameters:
  • cost <1-100000> – Optional. Specifies the link cost in arbitrary units
    • <1-100000> – Specify a value from 1 - 100000. The default is 100.
  **Note:** For MiNT VLAN routing the default is 10.

- hello-interval <1-120>
  This parameter is common to the ‘listen’ and ‘vlan’ parameters:
  • hello-interval <1-120> – Optional. Specifies the interval, in seconds, between successive hello packets
    • <1-120> – Specify a value from 1 - 120. The default is 15 seconds.
  **Note:** For MiNT VLAN routing the default is 4 seconds.

- level [1|2]
  This parameter is common to the ‘listen’ and ‘vlan’ parameters:
  Optional. Specifies the routing levels for this routing link. The options are:
  • 1 – Configures local routing
  • 2 – Configures inter-site routing
### mint link ip \[<IPv4>|<IPv6>|<HOST-ALIAS-NAME>]\]

Creates a MiNT routing link
- **ip** – Creates a MiNT tunnel over UDP/IP or IPv6

Use this keyword to specify the IP address (IPv4 or IPv6) used by peers for interoperation when supporting the MiNT protocol.
- \(<IPv4>\) – Specify the IPv4 address used by peers.
- \(<IPv6>\) – Specify the IPv6 address used by peers.
- \(<HOST-ALIAS-NAME>\) – Specify the host alias identifying the MiNT tunnel peer’s address. The host alias should existing and configured.

- \(<1-65535>\) Select the peer UDP port from 1 - 65535.
- \(adjacency-hold-time <2-600>\)

Optional. Specifies the adjacency lifetime after hello packets cease
- \(<2-600>\) – Specify a value from 2 - 600 seconds. The default is 46 seconds.

- \(<1-100000>\)

Optional. Specifies the link cost in arbitrary units
- \(<1-100000>\) – Specify a value from 1 - 100000. The default is 100.

- \(<1-120>\)

Optional. Specifies the interval, in seconds, between successive hello packets
- \(<1-120>\) – Specify a value from 1 - 120. The default is 15 seconds.

- level [1|2]

Optional. Specifies the routing levels for this routing link. The options are:
- 1 – Configures local routing
- 2 – Configures inter-site routing

- \(ipsec-security \{gw \[<IP>|<HOST-NAME>]\}\)

Optional. Enables IPSec secure peer authentication on the MiNT connection (link).
This option is disabled by default.
- **gw \[<IP>|<HOSTNAME>\]** – Optional. Configures the IPSec secure gateway. When enabling IPSec, you can optionally specify the IPSec secure gateway’s numerical IP address or administrator defined hostname.

### mint mlcp [ip|ipv6|vlan]

Configures the MLCP using the IP address or VLAN. MLCP is used to create a UDP/IP link from the device to a neighbor. The neighboring device does not need to be a wireless controller or service platform, it can be another access point with a path to the wireless controller or service platform.
- **vlan** – Enables MLCP over layer 2 (VLAN) links
- **ip** – Enables MLCP over layer 3 (UDP/IP) links. When enabled, allows adoption over IPv4 address.
- **ipv6** – Enables MLCP over layer 3 (UDP/IPv6) links. When enabled, allows adoption over IPv6 address.
• `mint rate-limit level2` [link [ip <IPv4/IPv6> <1-65535>|vlan <1-4094>]]
  mlcp [ip|ipv6|vlan] rate <50-1000000> max-burst-size <2-1024> [red-threshold [background|best-effort|video|voice] <0-100>]

<table>
<thead>
<tr>
<th>mint</th>
<th>Configures MiNT protocol parameters required for MiNT link creation and adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td>mint rate-limit level2</td>
<td>Applies rate limits on extended VLAN traffic Excessive traffic can cause performance issues on an extended VLAN. Excessive traffic can be caused by numerous sources including network loops, faulty devices, or malicious software. Rate limiting reduces the maximum rate sent or received per wireless client. It prevents any single user from overwhelming the wireless network, and also provides differential service for service providers. Uplink and downlink rate limits are usually configured on a RADIUS server using vendor specific attributes. Rate limits are extracted from the RADIUS server’s response. When such attributes are not present, the settings defined on the controller, service platform or access point are applied. You can set separate QoS rate limit configurations for data types transmitted from the network (upstream) and data transmitted from a wireless clients back to associated radios (downstream).</td>
</tr>
<tr>
<td>link [ip &lt;IPv4/IPv6&gt; &lt;1-65535&gt;</td>
<td>vlan &lt;1-4094&gt;]</td>
</tr>
</tbody>
</table>
  • ip <IPv4/IPv6> – Configures rate limits for MiNT link traffic over UDP/IP
  • <IPv4/IPv6> – Specify the MiNT peer’s IPv4 or IPV6 address in the A.B.C.D and X:X::X:X formats respectively.
  • <1-65535> – Configures the virtual port used for rate limiting traffic. Specify the UDP port from 1 - 65535.
  • vlan <1-4094> – Configures rate limits for MiNT link traffic on specified VLAN
  • <1-4094> – Specify the VLAN ID from 1 - 4094. |
| mlcp [ip|ipv6|vlan] | Configures rate limit parameters applicable for MLCP MLCP creates a UDP/IP link from the device to a neighbor. The neighboring device does not need to be a controller or service platform, it can be an access point with a path to the controller or service platform. |
  • ip – Configures rate-limits for MLCP over UDP/IPv4 links
  • ipv6 – Configures rate-limits for MLCP over UDP/IPv6 links
  • vlan – Configures rate-limits for MLCP over VLAN links |
| rate <50-1000000> | Configures the rate limit from 50 - 1000000 Kbps This limit constitutes a threshold for the maximum number of packets transmitted or received (from all access categories). Traffic exceeding the defined rate is dropped and a log message is generated. The default setting is 5000 Kbps. |
| max-burst-size <2-1024> | Configures the maximum burst size from 0 - 1024 Kbytes Smaller the burst size, lesser is the probability of the upstream packet transmission resulting in congestion for the WLAN’s client destinations. By trending the typical number of ARP, broadcast, multicast and unknown unicast packets over a period of time, the average rate for each access category can be obtained. Once a baseline is obtained, add a 10% margin (minimally) to allow for traffic bursts. The default burst size is 320 Kbytes. |
red-threshold [background|best-effort|video|voice] <0-100>

Optional. Configures the random early detection (RED) threshold (as a percentage) for the following traffic types:

- **background** – Configures the RED threshold for low priority background traffic. Background packets are dropped and a log message generated if the rate exceeds the set value. Background traffic consumes the least bandwidth of any access category, so this value can be set to a lower value once a general upstream rate is known by the network administrator (using a time trend analysis). The default setting is 50%.

- **best-effort** – Configures the RED threshold for low priority best-effort traffic. Best-effort packets are dropped and a log message generated if the rate exceeds the set value. Best effort traffic consumes little bandwidth, so this value can be set to a lower value once a general upstream rate is known by the network administrator (using a time trend analysis). The default setting is 50%.

- **video** – Configures the RED threshold for high priority video traffic. Video packets are dropped and a log message generated if the rate exceeds the set value. Video traffic consumes significant bandwidth, so this value can be set to a higher value once a general upstream rate is known by the network administrator (using a time trend analysis). The default setting is 25%.

- **voice** – Configures the RED threshold for high priority voice traffic. Voice packets are dropped and a log message generated if the rate exceeds the set value. Voice applications consume significant bandwidth, so this value can be set to a higher value once a general upstream rate is known by the network administrator (using a time trend analysis). The default setting is 0%.

- **<0-100>** – After selecting the traffic type, specify the RED threshold from 0 - 100%.

- **mint spf-latency <0-60>**

mint Configures MiNT protocol parameters required for MiNT link creation and adoption

**spf-latency <0-60>**

Specifies the latency of SPF routing recalculation

This option allows you to set the latency of routing recalculation option (within the Shortest Path First (SPF) field). This option is disabled by default.

- **<0-60>** – Specify the latency from 0 - 60 seconds.

- **mint tunnel-across-extended-vlan**

mint Configures MiNT protocol parameters required for MiNT link creation and adoption

tunnel-across-extended-vlan Enables tunneling of MiNT protocol packets across an extended VLAN. This setting is disabled by default.

- **mint tunnel-controller-load-balancing level1**

mint Configures MiNT protocol parameters required for MiNT link creation and adoption

tunnel-controller-load-balancing level1 Enables load balancing of MiNT extended VLAN traffic across tunnels

- **level1** – Enables balancing of load of a tunnel wireless controller or service platform over VLAN links
Examples

rfs7000-37FABE(config-profile-default-rfs7000)#mint level 1 area-id 88
rfs7000-37FABE(config-profile-default-rfs7000)#mint link ip 1.2.3.4 level 2
rfs7000-37FABE(config-profile-default-rfs7000)#show context
  profile rfs7000 default-rfs7000
    mint link ip 1.2.3.4 level 2
    mint level 1 area-id 88
    bridge vlan 1
  --More--
rfs7000-37FABE(config-profile-default-rfs7000)#

nx9500-6C8809(config-device-84-24-8D-1B-B9-0C)#show context
  ap7522 84-24-8D-1B-B9-0C
    use profile default-ap7522
    use rf-domain default
    hostname ap7522-1BB90C
    no staging-config-learnt
  nx9500-6C8809(config-device-84-24-8D-1B-B9-0C)

nx9500-6C8809(config-device-84-24-8D-1B-B9-0C)#mint inter-tunnel-bridging

nx9500-6C8809(config-device-84-24-8D-1B-B9-0C)#show context
  ap7522 84-24-8D-1B-B9-0C
    use profile default-ap7522
    use rf-domain default
    hostname ap7522-1BB90C
    no staging-config-learnt
    mint inter-tunnel-bridging
  nx9500-6C8809(config-device-84-24-8D-1B-B9-0C)#

Related Commands

no | Disables or reverts settings to their default
### 7.1.54 misconfiguration-recovery-time

**Profile Config Commands**

Verifies connectivity after a configuration is received

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

misconfiguration-recovery-time [0|<60-300>]

**Parameters**

- **misconfiguration-recovery-time [0|<60-300>]**

<table>
<thead>
<tr>
<th>&lt;60-300&gt;</th>
<th>Sets the recovery time from 60 - 300 seconds (default is 180 seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Disables recovery from misconfiguration</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-profile-default-rfs7000)#misconfiguration-recovery-time 65

```
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  mint link ip 1.2.3.4
  mint level 1 area-id 88
  bridge vlan 1
  bridging-mode isolated-tunnel
  ..................................................
  qos trust 802.1p
  interface pppoe1
  use firewall-policy default
misconfiguration-recovery-time 65
service pm sys-restart
router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#
```

**Related Commands**

- **no** Reverts to default (180 seconds)
### 7.1.55 neighbor-inactivity-timeout

**Profile Config Commands**

Configures neighbor inactivity timeout

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
neighbor-inactivity-timeout <1-1000>
```

**Parameters**

- `neighbor-inactivity-timeout <1-1000>`

**Examples**

```
rfs7000-37FABE(config-profile-default)#neighbor-inactivity-timeout 500

rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  mint link ip 1.2.3.4
  mint level 1 area-id 88
  bridge vlan 1
    bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier
neighbor-inactivity-timeout 500
autoinstall configuration
autoinstall firmware
crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ikev2 policy ikev2-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
crypto ikev1 remote-vpn
crypto ikev2 remote-vpn
crypto auto-ipsec-secure
interface mel
interface gel
  ip dhcp trust
  qos trust dscp
  qos trust 802.1p
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#
```
7.1.56 neighbor-info-interval

Profile Config Commands

Configures the neighbor information exchange interval

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

neighbor-info-interval <1-100>

Parameters
- neighbor-info-interval <1-100>

| <1-100> | Sets interval from 1 - 100 seconds. The default is 10 seconds. |

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#neighbor-info-interval 6

rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  mint link ip 1.2.3.4
  mint level 1 area-id 88
  bridge vlan 1
  bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier
neighbor-info-interval 6
neighbor-inactivity-timeout 500
autoinstall configuration
autoinstall firmware
crypto ikev1 policy ikev1-default
isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ikev2 policy ikev2-default
isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
crypto ikev1 remote-vpn
crypto ikev2 remote-vpn
crypto auto-ipsec-secure
interface me1
interface gel
ip dhcp trust
qos trust dscp
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#
7.1.57 no

Profile Config Commands

Negates a command or resets values to their default

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax


Parameters

- no <PARAMETERS>

Usage Guidelines

The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

Examples

```bash
rfs7000-6DCD4B(config-profile-default-rfs7000)#show context profile rfs7000 default-rfs7000 autoinstall configuration autoinstall firmware crypto ikev1 policy ikev1-default isakmp-proposal default encryption aes-256 group 2 hash sha crypto ikev2 policy ikev2-default isakmp-proposal default encryption aes-256 group 2 hash sha crypto ipsec transform-set default esp-aes-256 esp-sha-hmac crypto ikev1 remote-vpn crypto ikev2 remote-vpn crypto auto-ipsec-secure crypto remote-vpn-client interface me1 interface ge1 interface ge2 interface ge3 interface ge4 interface pppoe1 use firewall-policy default service pm sys-restart adopter-auto-provisioning-policy-lookup evaluate-always router ospf adoption start-delay min 10 max 30 rfs7000-6DCD4B(config-profile-default-rfs7000)#
```
rfs7000-6DCD4B(config-profile-default-rfs7000)#no adopter-auto-provisioning-policy-lookup
rfs7000-6DCD4B(config-profile-default-rfs7000)#no adoption start-delay

rfs7000-6DCD4B(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  autoinstall configuration
  autoinstall firmware
  crypto ikev1 policy ikev1-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ikev2 policy ikev2-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
  crypto ikev1 remote-vpn
  crypto ikev2 remote-vpn
  crypto auto-ipsec-secure
  crypto remote-vpn-client
  interface me1
  interface ge1
  interface ge2
  interface ge3
  interface ge4
  interface pppoe1
  use firewall-policy default
  service pm sys-restart
  router ospf
rfs7000-6DCD4B(config-profile-default-rfs7000)#
### 7.1.58 noc

**Profile Config Commands**

Configures *Network Operations Center* (NOC) statistics update interval. This is the interval at which statistical updates are sent by the RF Domain manager to its adopting controller (the NOC controller).

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
noc update-interval [<5-3600>|auto]
```

**Parameters**

- `noc update-interval [<5-3600>|auto]`

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000)#noc update-interval 25
```

```
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  mint link ip 1.2.3.4
  mint level 1 area-id 88
  bridge vlan 1
  bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier
  ...................................................
interface pppoe1
use firewall-policy default
misconfiguration-recovery-time 65
noc update-interval 25
service pm sys-restart
router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#
```

**Related Commands**

```
no
```

Resets NOC related parameters
7.1.59 nsight

**Profile Config Commands**

Configures NSight database related parameters. Use this command to configure the data-update periodicity, number of applications posted to the NSight server for a wireless client, and the duration for which data is stored in the NSight database’s buckets. These parameters impact the amount of data stored in the NSight DB and interval at which data is aggregated and expired within the NSight DB. For more information on data aggregation and expiration, see *(Data Aggregation and Expiration)*.

Configure these parameters in the NSight server’s profile configuration mode. These parameters are also configurable on the NSight server’s device configuration mode.

Supported in the following platforms:

- Service Platforms — NX9000, NX9500, NX9510, NX9600, VX9000

**Syntax**

```
nught database [statistics|summary]
nught database statistics [avc-update-interval|max-apps-per-client|  
    max-http-usage-metadata|max-http-visits-metadata|max-ssl-usage-metadata|  
    max-ssl-visits-metadata|update-interval|wireless-clients-update-interval]
nught database statistics [avc-update-interval|update-interval|  
    wireless-clients-update-interval] [120|30|300|60|600]
nught database statistics max-apps-per-client <1-1000>
nught database statistics [max-http-usage-metadata|max-http-visits-metadata|  
    max-ssl-usage-metadata|max-ssl-visits-metadata] <1-1000>
nught database summary duration <1-24> <1-168> <1-2160> <24-26280>
```

**Parameters**

- **nsight database statistics [avc-update-interval|update-interval|wireless-clients-update-interval]** [120|30|300|60|600]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>avc-update-interval</strong></td>
<td>Configures the interval, in seconds, at which Application Visibility and Control (AVC) statistics is updated to the NSight database. This interval represents the rate at which AVC-related data is inserted in the NSight database’s first bucket. This first bucket data is referred to as the RAW records. A bucket is a database collection that holds statistical data on a per RF Domain basis. For more information, see <em>(Data Aggregation and Expiration)</em>. When configured, RF Domain managers posting AVC-related data to the NSight server receive a reply from the NSight server intimating the next update time. The NSight server calculates the ‘next update time’ based on the <strong>avc-update-interval</strong> configured here.</td>
</tr>
<tr>
<td><strong>update-interval</strong></td>
<td>Configures the interval, in seconds, at which data is updated to the NSight server. This interval represents the rate at which data (excluding AVC and wireless-clients related statistics) is inserted in the NSight database’s first bucket. This first bucket data is referred to as the RAW records. A bucket is a database collection that holds statistical data on a per RF Domain basis. For more information, see <em>(Data Aggregation and Expiration)</em>.</td>
</tr>
</tbody>
</table>

Contd...
contd.. When configured, RF Domain managers posting data to the NSight server receive a reply from the NSight server intimating the next update time. The NSight server calculates the 'next update time' based on the update-interval configured here.

**Note:** Use the 'avc-update-interval' and 'wireless-clients-update-interval' keywords to configure update interval for AVC-related and wireless-clients related information respectively.

| wireless-clients-update-interval | Configures the interval, in seconds, at which wireless-client statistics is updated to the NSight server. This interval represents the rate at which wireless-clients related statistics is inserted in the NSight database's first bucket. This first bucket data is referred to as the RAW records. A bucket is a database collection that holds statistical data on a per RF Domain basis. For more information, see *(Data Aggregation and Expiration)*.

When configured, RF Domain managers posting wireless-client related data to the NSight server receive a reply from the NSight server intimating the next update time. The NSight server calculates the 'next update time' based on the wireless-clients-update-interval configured here.

| [120|30|300|60|600] The following keywords are common to all of the above parameters:
| 120 – Sets the data-update periodicity as 120 seconds (2 minutes)
| 30 – Sets the data-update periodicity as 30 seconds
| 300 – Sets the data-update periodicity as 300 seconds (5 minutes). This is the default setting for the 'avc-update-interval' and 'wireless-clients-update-interval' parameters.
| 60 – Sets the data-update periodicity as 60 seconds (1 minute). This is the default setting for the 'update-interval' parameter.
| 600 – Sets the data-update periodicity as 600 seconds (10 minutes)

- **nsight database statistics max-apps-per-client <1-1000>**

- **nsight database statistics** Configures NSight database statistics related parameters

- **max-apps-per-client** Configures the maximum number of applications per wireless-client to be posted to the NSight server within the configured data-update interval. This information is included in the AVC statistics posted by RF Domain managers to the NSight server.

- **<1-1000>** Specify the number of applications posted from 1 - 1000. The default is 10 applications per wireless client.


- **nsight database statistics** Configures NSight database statistics related parameters

- **[max-http-usage-metadata|max-http-visits-metadata|max-ssl-usage-metadata|max-ssl-visits-metadata]** Configures the number of HTTP and/or SSL metadata posted within an update interval

  - max-http-usage-metadata – Configures the NSight database maximum http-metadata by usage (rx+tx) to be posted in an update-interval
  - max-http-visits-metadata – Configures the NSight database’s maximum http-metadata by the number of visits to be posted within an update-interval
  - max-ssl-usage-metadata – Configures the NSight database maximum ssl-metadata by usage (rx+tx) to be posted in an update-interval
  - max-ssl-visits-metadata – Configures the NSight database maximum ssl-metadata by the number of visits to be posted within an update-interval

Contd...
PROFILES 7-411

Usage Guidelines (Data Aggregation and Expiration)

Data Aggregation:
Zebra’s NSight functionality, a data analytics tool, analyzes data that is generated periodically by the nodes within the managed wireless LAN. For large WLAN networks, generating significantly large amount of data, storing data forever is neither feasible nor beneficial. Therefore, older statistics are summarized into aggregated (averaged) records. All records, for a fixed time period in past, are summarized into one record by taking an average of them. Although this causes a loss in the data’s granularity, average numbers for any given time period is still available.

Statistical data periodically posted by RF Domain managers to the NSight server are stored in buckets (database collections) within the NSight database. There are four buckets in total. These are:

- First bucket (termed as the RAW bucket) - B1
- Second bucket - B2
- Third bucket - B3
- Fourth bucket - B4

On completion of the data storage duration, records from a bucket are aggregated (at a fixed rate) and inserted into the next bucket. The rate at which records are aggregated into the next bucket becomes the next bucket’s granularity. For example, the B1 records (that have exceeded the data storage duration configured for B1) are aggregated (at the rate specified) and inserted into B2. Similarly, data from B2 are aggregated into B3, and from B3 to B4. The fixed rate of aggregation (or granularity) AND default storage duration for each bucket is as follows:

- B1: storage duration 8 hours
- B2: granularity 10 minutes / storage duration 24 hours
- B3: granularity 1 hour / storage duration 7 days
- B4: granularity 1 day / storage duration 1 year

Let us consider (with default update-interval settings) the growth of any one of the statistical buckets.
Since B1’s default data storage duration is 8 hours, B1 will hold a maximum of 960 records per RF Domain after 8 hours (updated at the rate of 30 seconds).

Since B2’s granularity is 10 minutes, every 10 minutes 20 records from the B1 will be aggregated into a single record and inserted into B2.

Since B2’s default storage duration is 24 hours, it will contain a maximum of 144 records per RF Domain after 24 hours.

Since B3’s granularity is 1 hour, every hour 6 records from B2 will be aggregated into a single record and inserted into B3.

Since B3’s default storage duration is 7 days, it will contain a maximum of 168 records per RF Domain after 7 days.

Since B4’s granularity is 1 day, every day 24 records from B3 will be aggregated into a single record and inserted into B4.

Since B4’s default storage duration is 365 days, it will contain a maximum of 365 records per RF Domain after 1 year.

Data Expiration:
The expiration of older records (also referred to as purging or deleting of records) occurs along with data aggregation for each bucket.

Let us consider (with default data storage-duration settings) the expiration of data for any one of the statistical buckets.

As stated earlier, at the end of 8 hours B1 will have 960 records per RF Domain. After a period of 8 hours and 10 minutes, all 960 records are aggregated into 144 records and inserted into B2. To enable B1 to hold exactly 8 hours worth of data, 20 of the oldest records (corresponding to the first 10 minutes) are purged from B1 at the end of 8 hours and 10 minutes. This expiration cycle is triggered every 10 minutes.

At the end of 24 hours B2 will have 144 records per RF Domain. After a period of 24 hours and 10 minutes, one of the oldest record (corresponding to the first 10 minutes) is purged from B2. This expiration cycle is triggered every 10 minutes to enable B2 to maintain exactly 24 hours worth of data.

At the end of 7 days B3 will have 168 records per RF Domain. After a period of 7 days and one hour one of the oldest record (corresponding to the first hour) is purged from B3. This expiration cycle is triggered every 1 hour to enable B3 to maintain exactly 7 days worth of data.

At the end of 365 days B4 will have 365 records per RF Domain. After 365 days, the oldest records (corresponding to the first day) are purged from B4. This expiration cycle is triggered every 1 day to enable B4 to maintain exactly 365 days worth of data.

Examples
nx9500-6C8809(config-profile-testNX9000)#nsight database statistics avc-update-interval 120

nx9500-6C8809(config-profile-testNX9000)#nsight database statistics update-interval 30

nx9500-6C8809(config-profile-testNX9000)#nsight database statistics wireless-clients-update-interval 600

nx9500-6C8809(config-profile-testNX9000)#nsight database statistics max-apps-per-client 20

nx9500-6C8809(config-profile-testNX9000)#nsight database summary duration 12 30 200 500
nx9500-6C8809(config-profile-testNX9000)#show context include-factory | include nsight
use nsight-policy nsight-noc
nsight database statistics update-interval 30
nsight database statistics wireless-clients-update-interval 600
nsight database summary duration 12 30 200 500
nsight database statistics avc-update-interval 120
nsight database statistics max-apps-per-mu 20
nx9500-6C8809(config-profile-testNX9000)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Reverts the NSight database related parameters configured to default values</td>
</tr>
</tbody>
</table>
### 7.1.60 ntp

Profile Config Commands

Configures the Network Time Protocol (NTP) server settings

NTP manages time and/or network clock synchronization within the network. NTP is a client/server implementation. Controllers, service platforms, and access points (NTP clients) periodically synchronize their clock with a master clock (an NTP server). For example, a controller resets its clock to 07:04:59 upon reading a time of 07:04:59 from its designated NTP server.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```plaintext
ntp server <PEER-IP/HOSTNAME> {autokey/key/maxpoll/minpoll/prefer/version}
ntp server <PEER-IP/HOSTNAME> {autokey}
ntp server <PEER-IP/HOSTNAME> {maxpoll [1024|2048|4096|8192]}
ntp server <PEER-IP/HOSTNAME> {minpoll [1024|128|256|512|64]}
ntp server <PEER-IP> {key <1-65534> md5 [0 <WORD>|2<WORD>|<WORD>]}
ntp server <PEER-IP/HOSTNAME> {prefer version <1-4}|version <1-4> prefer}
```

#### Parameters

- **ntp server <PEER-IP/HOSTNAME> {autokey} {prefer version <1-4}|version <1-4> prefer}**

<table>
<thead>
<tr>
<th>ntp server &lt;PEER-IP/HOSTNAME&gt;</th>
<th>Configures NTP server resources that are used to obtain system time</th>
</tr>
</thead>
<tbody>
<tr>
<td>• autokey</td>
<td>Optional. Enables automatic configuration of authentication key for the specified NTP server. This option is disabled by default. If not enabled, use the 'key' option to configure an authentication key for the NTP server.</td>
</tr>
</tbody>
</table>

- **ntp server <PEER-IP/HOSTNAME> {maxpoll [1024|2048|4096|8192]}**

<table>
<thead>
<tr>
<th>ntp server &lt;PEER-IP/HOSTNAME&gt;</th>
<th>Configures NTP server resources that are used to obtain system time</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxpoll [1024</td>
<td>2048</td>
</tr>
<tr>
<td>1024 — Configures the maximum polling interval as 1024 seconds. This is the default setting.</td>
<td></td>
</tr>
<tr>
<td>2048 — Configures the maximum polling interval as 2048 seconds</td>
<td></td>
</tr>
<tr>
<td>4096 — Configures the maximum polling interval as 4096 seconds</td>
<td></td>
</tr>
<tr>
<td>8192 — Configures the maximum polling interval as 8192 seconds</td>
<td></td>
</tr>
</tbody>
</table>
### ntp server <PEER-IP/HOSTNAME> {minpoll [1024/128/256/512/64]}

<table>
<thead>
<tr>
<th>Minpoll</th>
<th>Configures the minimum polling interval. Once set, the specified NTP server is polled no sooner than the defined interval. Select one of the following options:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1024</td>
<td>Configures the minimum polling interval as 1024 seconds.</td>
</tr>
<tr>
<td>128</td>
<td>Configures the minimum polling interval as 128 seconds.</td>
</tr>
<tr>
<td>256</td>
<td>Configures the minimum polling interval as 256 seconds.</td>
</tr>
<tr>
<td>512</td>
<td>Configures the minimum polling interval as 512 seconds.</td>
</tr>
<tr>
<td>64</td>
<td>Configures the minimum polling interval as 64 seconds. This is the default setting.</td>
</tr>
</tbody>
</table>

### ntp server <PEER-IP/HOSTNAME> {key <1-65534> md5 [0 <WORD>|2<WORD>|<WORD>]}

<table>
<thead>
<tr>
<th>Key options</th>
<th>Configures the authentication key for the specified NTP server. This option is used to configure the key when 'autokey' configuration is not enabled.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-65534&gt;</td>
<td>Specify the peer key number. Should not exceed 64 characters in length.</td>
</tr>
<tr>
<td>md5</td>
<td>Sets MD5 authentication</td>
</tr>
<tr>
<td>0 &lt;WORD&gt;</td>
<td>Configures a clear text password</td>
</tr>
<tr>
<td>2 &lt;WORD&gt;</td>
<td>Configures an encrypted password</td>
</tr>
<tr>
<td>&lt;WORD&gt;</td>
<td>Sets an authentication key</td>
</tr>
</tbody>
</table>

### ntp server <PEER-IP/HOSTNAME> {prefer version <1-4>|version <1-4> prefer}

<table>
<thead>
<tr>
<th>Prefer version</th>
<th>Configures the version number used by the specified NTP server resource. This setting is disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-4&gt;</td>
<td>Select the NTP version from 1 - 4. If not specified, the default value of ‘0’ is applied, which implies that the NTP server’s version is ignored.</td>
</tr>
<tr>
<td>prefer</td>
<td>Optional. Designates the specified NTP server as a preferred NTP resource. This setting is disabled by default. The NTP version number specified using the ‘version &lt;1-4&gt;’ keyword is applied to this preferred NTP resource.</td>
</tr>
</tbody>
</table>
**Examples**

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000)# ntp server 172.16.10.10 version 1 prefer
rfs7000-37FABE(config-profile-default-rfs7000)# show context profile rfs7000 default-rfs7000
  mint link ip 1.2.3.4
  mint level 1 area-id 88
  bridge vlan 1
    bridging-mode isolated-tunnel
  ip igmp snooping
  ip igmp snooping querier

interface pppoe1
  use firewall-policy default
  ntp server 172.16.10.10 prefer version 1
  misconfiguration-recovery-time 65
  noc update-interval 25
  service pm sys-restart
  router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables or reverts settings to their default</td>
</tr>
</tbody>
</table>
7.1.61 offline-duration

Profile Config Commands

Sets the duration, in minutes, for which a device remains unadopted before it generates offline event. This command is also supported on the device configuration mode.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

offline-duration <5-43200>

Parameters

- offline-duration <5-43200>

| offline-duration <5-43200> | Specify a value from 5 - 43200 minutes. The default is 10 minutes. |

Examples

rfs4000-229D58(config-profile-test)#offline-duration 200

rfs4000-229D58(config-profile-test)#show context
profile rfs4000 test
no autoinstall configuration
no autoinstall firmware
crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  .................................................................
interface wwan1
interface pppoe1
use firewall-policy default
service pm sys-restart
router ospf
  offline-duration 200
rfs4000-229D58(config-profile-test)#

Related Commands

- no
  Resets the offline-duration to default (10 minutes)
7.6.2 power-config

Profile Config Commands

Configures the power option mode. Use this command in the profile configuration mode to configure the transmit output power of access point radios. This command is also available in the device-config mode.

Single radio model access points always operate using a full power configuration. The power management configurations described in this section do not apply to single radio models. When an access point is powered on for the first time, the system determines the power budget available to the access point. If 802.3af is selected, the access point assumes 12.95 watts is available. If the mode is changed, the access point requires a reset to implement the change. If 802.3at is selected, the access point assumes 23 - 26 watts is available.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

power-config [af-option|at-option|mode]

power-config [af-option|at-option] [range|throughput]

power-config mode [auto|3af]

Parameters

- power-config [af-option|at-option] [range|throughput]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>power-config</td>
<td>Configures the power option mode</td>
</tr>
</tbody>
</table>
| af-option [range|throughput] | Configures the 802.3.af power mode option. The options are:  
  - range — Configures the af power range mode. This mode provides higher power but fewer transmission (tx) chains.  
  - throughput — Configures the af power throughput mode. This mode provides lower power but has more tx chains. This is the default setting.  Select throughput to transmit packets at the radio's highest defined basic rate (based on the radio's current basic rate settings). This option is optimal in environments where transmission range is secondary to broadcast/multicast transmission performance. |
| at-option [range|throughput] | Configures the 802.3 at power mode option. The options are:  
  - range — Configures the at power range mode. This mode provides higher power but fewer tx chains.  |
Contd..
Select range when range is preferred over performance for broadcast/multicast (group) traffic. The data rates used for range are the lowest defined basic rates.

- **throughput** – Configures the at power throughput mode. This mode provides lower power but has more tx chains. This is the default setting.

Select throughput to transmit packets at the radio’s highest defined basic rate (based on the radio’s current basic rate settings). This option is optimal in environments where transmission range is secondary to broadcast/multicast transmission performance.

### Examples

```bash
nx9500-6C8809(config-profile-testAP71XX)#power-config mode 3af

nx9500-6C8809(config-profile-testAP71XX)#power-config af-option range

nx9500-6C8809(config-profile-testAP71XX)#show context
profile ap71xx testAP71XX
  no autoinstall configuration
  no autoinstall firmware
  power-config mode 3af
  power-config af-option range
  crypto ikev1 policy ikev1-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ikev2 policy ikev2-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
--More--
nx9500-6C8809(config-profile-testAP71XX)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
</tr>
</tbody>
</table>

---

**power-config** Configures the power option mode

- **mode [auto|3af]** Configures the AP power mode
  - **3af** – Forces an AP to power up in the 802.3af power mode
  - **auto** – Sets the detection auto mode (default setting)

The automatic power-config mode enables an access point to automatically determine the best power configuration based on the available power budget.
### 7.1.63 preferred-controller-group

**Profile Config Commands**

Specifies the controller group preferred for adoption.

At adoption, an access point solicits and receives multiple adoption responses from controllers and service platforms available on the network. These adoption responses contain loading policy information the access point uses to select the optimum controller or service platform for adoption. After selecting the controller or service platform, the access point associates with it and optionally obtains an image upgrade and configuration. By default, an auto provisioning policy generally distributes AP adoption evenly amongst available controllers and service platforms. Use this command to specify the controller or service platform preferred for adoption. Once configured, the access point adopts to the specified preferred controller or service platform.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533

**Syntax**

```
preferred-controller-group <WORD>
```

**Parameters**

- `preferred-controller-group <WORD>`

<table>
<thead>
<tr>
<th>&lt;WORD&gt;</th>
<th>Specify the name of the controller (wireless controller or service platform) group preferred for adoption. Devices using this profile are added, on adoption, to the controller group specified here.</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000)#preferred-controller-group testGroup
```

```
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  mint link ip 1.2.3.4
  mint level 1 area-id 88
  bridge vlan 1
    bridging-mode isolated-tunnel
    ip igmp snooping
    ip igmp snooping querier
  qos trust 802.1p
  interface pppoe1
  use firewall-policy default
  ntp server 172.16.10.10 prefer version 1
preferred-controller-group testGroup
misconfiguration-recovery-time 65
noc update-interval 25
service pm sys-restart
router ospf
```

**Related Commands**

```
no
```

Removes the preferred controller group configuration.
7.1.64 preferred-tunnel-controller

Profile Config Commands

Configures the tunnel controller’s name preferred for tunneling extended VLAN traffic. Devices using this profile will prefer to route their extended VLAN traffic through the specified tunnel controller (wireless controller or service platform).

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533

Syntax

preferred-tunnel-controller <NAME>

Parameters

- preferred-tunnel-controller <NAME>

| preferred-tunnel-controller <NAME> | Configures the preferred tunnel name |

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#preferred-tunnel-controller testtunnel

Related Commands

- no
  | Removes the preferred tunnel configuration |
### 7.1.65 radius

*Profile Config Commands*

Configures device level RADIUS authentication parameters

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
radius [nas-identifier|nas-port-id] <WORD>
```

**Parameters**

- `radius [nas-identifier|nas-port-id] <WORD>`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>radius</td>
<td>Configures RADIUS authentication parameters</td>
</tr>
<tr>
<td>nas-identifier &lt;WORD&gt;</td>
<td>Specifies the RADIUS Network Access Server (NAS) identifier attribute used by this device</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;WORD&gt;</code> – Specifies the NAS identifier</td>
</tr>
<tr>
<td>nas-port-id &lt;WORD&gt;</td>
<td>Specifies the RADIUS NAS port ID attribute used by this device</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;WORD&gt;</code> – Specifies the NAS port ID</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000)#radius nas-port-id 1
rfs7000-37FABE(config-profile-default-rfs7000)#radius nas-identifier test
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  mint link ip 1.2.3.4
  mint level 1 area-id 88
  bridge vlan 1
    bridging-mode isolated-tunnel
    ip igmp snooping querier
radius nas-identifier test
radius nas-port-id 1
neighbor-info-interval 6
neighbor-inactivity-timeout 500
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables or reverts settings to their default</td>
</tr>
</tbody>
</table>
7.1.66 rf-domain-manager

Profile Config Commands

Configures the RF Domain manager election criteria

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
rf-domain-manager [capable|priority <1-255>]

Parameters

<table>
<thead>
<tr>
<th>rf-domain-manager</th>
<th>Configures the RF Domain manager election criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>capable</td>
<td>Enables devices using this profile capable of being elected as the RF Domain manager. The RF Domain manager stores and provisions configuration and firmware images for other members of the RF Domain. It also updates state changes, if any, to RF Domain members. This option is enabled by default.</td>
</tr>
<tr>
<td>priority &lt;1-255&gt;</td>
<td>Assigns a priority value for devices using this profile in the RF Domain manager election process. The higher the number set, higher is the device’s priority in the RF Domain manager election process.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-255&gt; – Select a priority value from 1 - 255.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#rf-domain-manager priority 9
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  mint link ip 1.2.3.4
  mint level 1 area-id 88
  ..............................................
  rf-domain-manager priority 9
  preferred-controller-group testGroup
  misconfiguration-recovery-time 65
  noc update-interval 25
  service pm sys-restart
  preferred-tunnel-controller testtunnel
  router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

no | Disables or reverts settings to their default
7.1.67  **router**

- **Profile Config Commands**

  Enables dynamic routing (BGP and/or OSPF) and enters the routing protocol configuration mode

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

  **NOTE:** BGP is supported only on RFS4000, RFS6000, NX4500, NX6500, NX75XX, NX9000 and NX9500 model controllers and service platforms.

  The NX9500 and NX9510 service platforms do not support OSPF routing.
  The access points only support OSPF routing.

**Syntax**

`router [bgp|ospf]`

**Parameters**

- **router [bgp|ospf]**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>router</td>
<td>Enables dynamic routing and enters the routing protocol configuration mode</td>
</tr>
<tr>
<td>bgp</td>
<td>Enables BGP dynamic routing and configures relevant settings. BGP is an inter-ISP routing protocol, which establishes routing between ISPs. ISPs use BGP to exchange routing and reachability information between Autonomous Systems (AS) on the Internet. BGP uses TCP as its transport protocol, eliminating the need to implement explicit update fragmentation, retransmission, acknowledgement, and sequencing. Routing information exchanged through BGP supports destination based forwarding only. It assumes a router forwards packets based on the destination address carried in the IP header of the packet. An AS is a set of routers under the same administration that use Interior Gateway Protocol (IGP) and common metrics to define how to route packets within the AS. For more information on dynamic BGP routing configurations, see BORDER GATEWAY PROTOCOL.</td>
</tr>
<tr>
<td>ospf</td>
<td>Enables OSPF dynamic routing and configures relevant settings. Changes configuration mode to router mode OSPF is a link-state IGP. OSPF routes IP packets within a single routing domain (autonomous system), like an enterprise LAN. OSPF gathers link state information from neighbor routers and constructs a network topology. The topology determines the routing table presented to the Internet Layer which makes routing decisions based solely on the destination IP address found in IP packets. For more information on dynamic OSPF routing configurations, see ROUTER-MODE COMMANDS.</td>
</tr>
</tbody>
</table>
Examples

rfs7000-37FABE(config-profile-default-rfs7000)#router ospf

rfs7000-37FABE(config-profile default-rfs7000-router-ospf)##?
Router OSPF Mode commands:
  area           OSPF area
  auto-cost      OSPF auto-cost
  default-information Distribution of default information
  ip             Internet Protocol (IP)
  network        OSPF network
  no             Negate a command or set its defaults
  ospf           Ospf
  passive        Make OSPF Interface as passive
  redistribute   Route types redistributed by OSPF
  route-limit    Limit for number of routes handled OSPF process
  router-id      Router ID

  clrscr          Clears the display screen
  commit         Commit all changes made in this session
  do             Run commands from Exec mode
  end            End current mode and change to EXEC mode
  exit           End current mode and down to previous mode
  help           Description of the interactive help system
  revert         Revert changes
  service        Service Commands
  show           Show running system information
  write          Write running configuration to memory or terminal

rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables OSPF settings</td>
</tr>
</tbody>
</table>
7.1.68 **spanning-tree**

*Profile Config Commands*

Enables spanning tree commands. Use these commands to configure the errdisable, multiple spanning tree and portfast settings.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

- `spanning-tree [errdisable|mst|portfast]`
- `spanning-tree errdisable recovery [cause bpduguard|interval <10-1000000>]`
- `spanning-tree mst [<0-15>|cisco-interoperability|enable|forward-time|hello-time|instance|max-age|max-hops|region|revision]`
- `spanning-tree mst [<0-15> priority <0-61440>|cisco-interoperability [enable|disable]|enable|forward-time <4-30>|hello-time <1-10>|instance <1-15>|max-age <6-40>|max-hops <7-127>|region <LINE>|revision <0-255>]`
- `spanning-tree portfast [bpdufilter|bpduguard] default`

**Parameters**

- `spanning-tree errdisable recovery [cause bpduguard|interval <10-1000000>]`

<table>
<thead>
<tr>
<th>spanning-tree</th>
<th>Configures spanning-tree related parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>errdisable</td>
<td>Disables or shutdowns ports where traffic is looping, or ports with traffic in one direction</td>
</tr>
<tr>
<td>recovery</td>
<td>Enables the timeout mechanism for a port to be recovered. This option is disabled by default.</td>
</tr>
</tbody>
</table>
| cause bpduguard | Specifies the reason for errdisable
  - bpduguard – Recovers from errdisable due to bpduguard |
| interval <10-1000000> | Specifies the interval after which a port is enabled
  - <10-1000000> – Specify a value from 10 - 1000000 seconds. The default is 300 seconds. |

- `spanning-tree mst [<0-15> priority <0-61440>|cisco-interoperability [enable|disable]|enable|forward-time <4-30>|hello-time <1-10>|instance <1-15>|max-age <6-40>|max-hops <7-127>|region <LINE>|revision <0-255>]`

<table>
<thead>
<tr>
<th>spanning-tree</th>
<th>Configures Multiple Spanning Tree (MST) commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>mst</td>
<td>The MSTP provides an extension to STP to optimize the usefulness of VLANs. MSTP allows for a separate spanning tree for each VLAN group, and blocks all but one of the possible alternate paths within each spanning tree topology.</td>
</tr>
<tr>
<td><strong>&lt;0-15&gt; priority</strong>&lt;br&gt;<strong>&lt;0-61440&gt;</strong></td>
<td>Specifies the number of instances required to configure MST. Select a value from 0 - 15.&lt;br&gt;• priority – Sets the bridge priority to the specified value. This value is used to determine the root bridge. Use the no parameter with this command to restore the default bridge priority value.&lt;br&gt;• &lt;0-61440&gt; – Sets the bridge priority in increments (Lower priority indicates greater likelihood of becoming root)</td>
</tr>
<tr>
<td><strong>cisco interoperability</strong>&lt;br&gt;[enable</td>
<td>disable]</td>
</tr>
<tr>
<td><strong>enable</strong></td>
<td>Enables MST protocol</td>
</tr>
<tr>
<td><strong>forward-time &lt;4-30&gt;</strong></td>
<td>Specifies the forwarding delay time in seconds&lt;br&gt;• &lt;4-30&gt; – Specify a value from 4 - 30 seconds. The default is 15 seconds.</td>
</tr>
<tr>
<td><strong>hello-time &lt;1-10&gt;</strong></td>
<td>Specifies the hello BDPU interval in seconds&lt;br&gt;• &lt;1-10&gt; – Specify a value from 1 - 10 seconds. The default is 2 seconds.</td>
</tr>
<tr>
<td><strong>instance &lt;1-15&gt;</strong></td>
<td>Defines the instance ID to which the VLAN is associated&lt;br&gt;• &lt;1-15&gt; – Specify an instance ID from 1 - 10.</td>
</tr>
<tr>
<td><strong>max-age &lt;6-40&gt;</strong></td>
<td>Defines the maximum time to listen for the root bridge&lt;br&gt;• &lt;6-40&gt; – Specify a value from 4 - 60 seconds. The default is 20 seconds.</td>
</tr>
<tr>
<td><strong>max-hops &lt;7-127&gt;</strong></td>
<td>Defines the maximum hops when BPDU is valid&lt;br&gt;• &lt;7-127&gt; – Specify a value from 7 - 127. The default is 20.</td>
</tr>
<tr>
<td><strong>region &lt;LINE&gt;</strong></td>
<td>Specifies the MST region&lt;br&gt;• &lt;LINE&gt; – Specify the region name.</td>
</tr>
<tr>
<td><strong>revision &lt;0-255&gt;</strong></td>
<td>Sets the MST bridge revision number. This enables the retrieval of configuration information.&lt;br&gt;• &lt;0-255&gt; – Specify a value from 0 - 255. This default is 0.</td>
</tr>
</tbody>
</table>

* **spanning-tree portfast** [bpdufilter|bpduguard] default

**spanning-tree** Configures spanning-tree related parameters

**portfast [bpdufilter|bpduguard] default** Enables PortFast on a bridge<br>• bpdufilter default – Sets the BPDU filter for the port. The BPDU filter is disabled by default.<br>The spanning tree protocol sends BPDUs from all ports. Enabling the BPDU filter ensures that PortFast enabled ports do not transmit or receive BPDUs.<br>• bpduguard default – Guards PortFast ports against BPDU receive. The BPDU guard is disabled by default.<br>Enabling the BPDU guard means this port will shutdown on receiving a BPDU.<br>• default – Enables the BPDU filter and/or BPDU guard on PortFast enabled ports by default
Usage Guidelines

If a bridge does not hear BPDUs from the root bridge within the specified interval, assume the network has changed and recomputed the spanning-tree topology.

Generally, spanning tree configuration settings in the config mode define the configuration for bridge and bridge instances.

MSTP is based on instances. An instance is a group of VLANs with a common spanning tree. A single VLAN cannot be associated with multiple instances.

Wireless Controllers or service platforms with the same instance, VLAN mapping, revision number and region names define a unique region. Wireless Controllers or service platforms in the same region exchange BPDUs with instance record information within.

Examples

```
rfs7000-37FABE(config-profile-default-rfs7000)#spanning-tree errdisable recovery cause bpduguard
rfs7000-37FABE(config-profile-default-rfs7000)#spanning-tree mst 2 priority 4096
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  mint link ip 1.2.3.4
  mint level 1 area-id 88
  bridge vlan 1
    bridging-mode isolated-tunnel
    ip igmp snooping
    ip igmp snooping querier
    radius nas-identifier test
    radius nas-port-id 1
    neighbor-info-interval 6
    neighbor-inactivity-timeout 500
    spanning-tree mst 2 priority 4096
    spanning-tree errdisable recovery cause bpduguard
    autoinstall configuration
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables or reverts settings to their default</td>
</tr>
</tbody>
</table>
7.1.69 traffic-class-mapping

Profile Config Commands

Maps the IPv6 traffic class value of incoming IPv6 untagged packets to 802.1p priority. This mapping is required to provide priority of service to some packets over others. For example, VoIP packets get higher priority than data packets to provide a better quality of service for high priority voice traffic. Devices use the traffic class field in the IPv6 header to set this priority. This command allows you to assign a priority for different IPv6 traffic types.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

traffic-class-mapping <IPv6-TRAFFIC-CLASS-VALUE> priority <0-7>

Parameters

- traffic-class-mapping <IPv6-TRAFFIC-CLASS-VALUE> priority <0-7>

<table>
<thead>
<tr>
<th>traffic-class-mapping</th>
<th>Maps the IPv6 traffic class value of incoming IPv6 untagged packets to 802.1p priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IPv6-TRAFFIC-CLASS-VALUE&gt;</td>
<td>Specify the traffic class value of incoming IPv6 untagged packet(s) (could be a single value or a list. For example, 10-20, 25, 30-35). This is the DSCP 6-bit parameter in the header of every IP packet used for packet classification.</td>
</tr>
<tr>
<td>priority &lt;0-7&gt;</td>
<td>Specify the 802.1p priority to map with the traffic-class value specified in the previous step</td>
</tr>
</tbody>
</table>

- <0-7> – Specify a value from 0 - 7.

Note: The 802.1p priority is a 3-bit IP precedence value in the Type of Service field of the IP header used to set the priority. The valid values for this field are 0-7. Up to 64 entries are permitted. The priority values are:
  - 0 – Best Effort
  - 1 – Background
  - 2 – Spare
  - 3 – Excellent Effort
  - 4 – Controlled Load
  - 5 – Video
  - 6 – Voice
  - 7 – Network Control
Examples

rfs4000-229D58(config-profile-TestRFS4000)#traffic-class-mapping 25 priority 2

rfs4000-229D58(config-profile-TestRFS4000)#show context
profile rfs4000 TestRFS4000
traffic-class-mapping 25 priority 2
no autoinstall configuration
no autoinstall firmware
crypto ikev1 policy ikev1-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ikev2 policy ikev2-default
    isakmp-proposal default encryption aes-256 group 2 hash sha
crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
crypto ikev1 remote-vpn
crypto ikev2 remote-vpn
crypto auto-ipsec-secure
crypto remote-vpn-client
-More-
rfs4000-229D58(config-profile-TestRFS4000)#

Related Commands

| no   | Removes mapping between IPv6 traffic class value (of incoming IPv6 untagged packets) and 802.1p priority |
### 7.1.70 traffic-shape

**Profile Config Commands**

Enables traffic shaping and configures traffic shaping parameters. This command is applicable to both the profile and device configuration modes.

Traffic shaping is a means of regulating data transfers and ensuring a specific level of performance within a network. Traffic shaping does the following:

- Controls flow of packets based on their priority value. Prioritized traffic streams are given priority over less important traffic.
- Controls traffic on an interface to match its flow to the speed of a remote target’s interface and ensure traffic conforms to applied policies.
- Shapes traffic to meet downstream requirements and eliminate network congestion when data rates are in conflict.

Use this option to apply traffic shaping to specific applications or application categories. Note, in scenarios where a traffic class is matched against an application, application-category, and ACL rule, the application rule will be applied first, followed by the application-category, and finally the ACL. Further, using traffic shaping, an application takes precedence over an application category.

To enable traffic shaping, configure QoS values on the basis of which priority of service is provided to some packets over others. For example, VoIP packets get higher priority than data packets to provide a better quality of service for high priority voice traffic. For configuring IPv6 traffic class mappings, see `traffic-class-mapping`. And for configuring DSCP traffic class mappings, see `dscp-mapping`.

Supported in the following platforms:

- **Access Points** — AP622, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX5500, NX7500, NX7510, NX7520, NX7530

**Syntax**

```plaintext
traffic-shape [activation-criteria|app-category|application|class|enable|
priority-map|total-bandwidth]

traffic-shape activation-criteria [always|cluster-master|rf-domain-manager|
vrrp-master <1-255>]

traffic-shape app-category <APP-CATEGORY-NAME> class <1-4>

traffic-shape application <APPLICATION-NAME> class <1-4>

traffic-shape class <1-4> [max-buffers|max-latency|rate]

traffic-shape class <1-4> max-buffers <1-400> {red-level <1-400>|red-percent <1-100>}

traffic-shape class <1-4> max-latency <1-1000000> [msec|usec]

traffic-shape class <1-4> rate [<1-250000> [Kbps|Mbps]|total-bandwidth-percent <1-100>]

traffic-shape priority-map <0-7>

traffic-shape total-bandwidth <1-1000000> [Kbps|Mbps]
```

**NOTE:** The available range for the ‘rate’ field will vary depending on the unit selected. It is 250 - 250000 for Kbps and 1 - 250 for Mbps.
NOTE: The available range for the 'total-bandwidth' field will vary depending on the unit selected. It is 250 - 1000000 for Kbps and 1 - 1000 for Mbps.

`traffic-shape enable`

### Parameters
- **traffic-shape activation-criteria** [always|cluster-master|rf-domain-manager|vrrp-master <1-255>]

<table>
<thead>
<tr>
<th>traffic-shape activation-criteria</th>
<th>Configures traffic-shape activation criteria that determines when the device invokes traffic shaping</th>
</tr>
</thead>
<tbody>
<tr>
<td>always</td>
<td>Always invokes traffic shaping. This is the default setting.</td>
</tr>
<tr>
<td>cluster-master</td>
<td>Invokes traffic shaping when the device is the cluster master. The solitary cluster master (elected using a priority assignment scheme) is a cluster member that provides management configuration and Smart RF data to other members within the cluster. Cluster requests go through the elected master before dissemination to other cluster members.</td>
</tr>
<tr>
<td>rf-domain-manager</td>
<td>Invokes traffic shaping when the device is the RF Domain manager. The RF Domain manager is the elected member capable of storing and provisioning configuration and firmware images for other members of the RF Domain.</td>
</tr>
<tr>
<td>vrrp-master &lt;1-255&gt;</td>
<td>Invokes traffic shaping when the device is the VRRP master. As the VRRP master, the device responds to ARP requests, forwards packets with a destination link MAC layer address equal to the virtual router MAC layer address, rejects packets addressed to the IP associated with the virtual router and accepts packets addressed to the IP associated with the virtual router.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-255&gt; – Specify the VRRP group ID from 1 - 255.</td>
</tr>
</tbody>
</table>

- **traffic-shape app-category** <APP-CATEGORY-NAME> class <1-4>

<table>
<thead>
<tr>
<th>traffic-shape app-category &lt;APP-CATEGORY-NAME&gt; class &lt;1-4&gt;</th>
<th>Configures an application category to traffic-class mapping. Use this option to apply an application category to traffic-shaper class mapping. Naming and categorizing applications that do not fall into existing groups is an additional means of filtering and potentially limiting network airtime to consumptive non required applications negatively impacting network performance.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• app-category &lt;APP-CATEGORY-NAME&gt; – Specify the application category name. To list the available application categories, press [TAB] after entering app-category. Select the required category from the displayed list.</td>
</tr>
<tr>
<td></td>
<td>• class &lt;1-4&gt; – Map the specified application category to a traffic-shaper class from 1 - 4.</td>
</tr>
</tbody>
</table>

**Note:** Before configuring an application category to class mapping, ensure that the specified classes have been configured. Use the `class > [max-buffers|max-latency|rate]` option available with this command to configure a traffic shaper class. For more information, see following parameter tables.
## traffic-shape application <APPLICATION-NAME> class <1-4>

 Configures an application to traffic-class mapping. Use this option to apply an application to traffic-shaper class mapping.

- **app-category <APPLICATION-NAME>** – Specify the application name.
- **class <1-4>** – Map the specified application to a traffic-shaper class from 1 - 4.

**Note:** Before configuring an application to class mapping, ensure that the specified classes have been configured. Use the `class > [max-buffers|max-latency|rate]` option available with this command to configure a traffic shaper class. For more information, see following tables.

## traffic-shape class <1-4> max-buffers <1-400> {red-level <1-400>|red-percent <1-100>}

 Configures the queue length limit for different traffic-shaper class

- **class <1-4>** – Specify the traffic-shaper class from 1 - 4.
- **max-buffers <1-400>** – Configures the maximum queue lengths for packets of different priority queues, after which the queue starts to drop packets.
  - `<1-400>` – Configure the queue length limit from 1 - 400 for packets of priority queues 0, 1, 2, 3, 4, 5, 6, and 7.

**Note:** For access points the upper queue length limit is 400.

## red-level <1-400>

Optional. Performs Random Early Drop (RED) when a specified queue length in packets is reached

- `<1-400>` – Configure the queue length limit from 1 - 400 for packets of priority queues 0, 1, 2, 3, 4, 5, 6, and 7.

The RED algorithm is a queueing technique for congestion avoidance. RED monitors the average queue size and drops or marks packets. If the buffer is near empty, all incoming packets are accepted. When the queue grows, the probability for dropping an incoming packet also grows. When the buffer is full, the probability of reaching 1 and all incoming packets are dropped.

**Note:** For more information on default values, see the Usage Guidelines section in this topic.

## red-percent <1-100>

Optional. Performs RED when a specified value, which is a percentage of the max-buffers configured, is reached

- `<1-100>` – Configure the percentage of the max-buffers from 1 - 100 for packets of priority queues 0, 1, 2, 3, 4, 5, 6, and 7.

## traffic-shape class <1-4> max-latency <1-1000000> [msec|usec]

 Configures the max-latency for different traffic-shaper class. Max latency specifies the time limit after which packets start dropping (maximum packet delay in the queue). The maximum number of entries is 8.

- **class <1-4>** – Specify the traffic-shaper class from 1 - 4.
- **max-latency <1-1000000>** – Configures the max-latency for packets of different priority queues, after which the queue starts to drop packets.
  - `<1-1000000>` – Configure the max-latency from 1 - 100000 for packets of priority queues 0, 1, 2, 3, 4, 5, 6, and 7.
  - `[msec|usec]` – Configures the unit for measuring latency as milliseconds (msec) or microseconds (usec). The default setting is msec.
- **traffic-shape class <1-4> rate [<1-250000> [Kbps|Mbps]|total-bandwidth-percent <1-100>]**

  **traffic-shape class <1-4> rate**
  Configures traffic rate, in either Kbps, Mbps or percentage, for the different traffic shaper class. Specify rates for different traffic shaper class to control the maximum traffic rate sent or received on an interface. Consider this form of rate limiting on interfaces at the edge of a network to limit traffic into or out of the network. Traffic within the set limit is sent and traffic exceeding the set limit is dropped or sent with a different priority.
  - class <1-4> – Specify the traffic-shaper class from 1 - 4.

  **<1-250000> [Kbps|Mbps]**
  Configures the traffic rate, in Kbps, Mbps, for the class specified in the previous step
  - <1-250000> – Specify the rate from 1 - 250000.
  - [Kbps|Mbps] – Configures the unit for measuring bandwidth as Kbps or Mbps. The default setting is Kbps.

  **total-bandwidth-percent <1-100>**
  Configures the traffic rate, as a percentage of the total available bandwidth, for the class specified in the previous first step
  - <1-100> – Specify the traffic rate from 1 - 100% of the total bandwidth.

- **traffic-shape priority-map <0-7>**

  **traffic-shape priority-map <0-7>**
  Configures the traffic-shaper queues, within a class, having different priority values (0, 1, 2, 3, 4, 5, 6, and 7). There are 8 queues (0 - 7), and traffic is queued in each based on the incoming packet's 802.1p 3-bit priority markings.
  - priority-map <0-7> – Specify the priority from 0 - 7 for priority levels 0, 1, 2, 3, 4, 5, 6, and 7.

  The IEEE 802.1p standards sets a 3-bit value in the MAC header to indicate prioritization. This 3-bit value provides priority levels ranging from 0 to 7 (i.e., a total of 8 levels), with level 7 representing the highest priority. This permits packets to cluster and form different traffic classes. In case of network congestion, packets with higher priority receive preferential treatment while low priority packets are kept on hold.

- **traffic-shape total-bandwidth <1-1000000> [Kbps|Mbps]**

  **traffic-shape total-bandwidth <1-1000000> [Kbps|Mbps]**
  Configures the total-bandwidth for traffic shaping
  - <1-1000000> – Specify the value from 1 - 1000000 Kbps/Mbps. The default value is 10 Mbps.
  - [Kbps|Mbps] – Configures the unit for measuring bandwidth as Kbps or Mbps. The default setting is Mbps.

  **Note:** The range varies depending on the unit selected. It is 1 - 1000 Mbps, or 250 - 1000000 Kbps.

- **traffic-shape enable**

  **traffic-shape enable**
  Enables traffic shaping using the defined bandwidth, rate and class mappings configured using this command
  **Note:** Traffic shaping is disabled by default.
Usage Guidelines
Following are the default max-buffers set for the traffic shaper classes:

```plaintext
traffic-shape class 1 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape class 2 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape class 3 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape class 4 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
```

Following is the default priority-map settings:

```plaintext
traffic-shape priority-map 2 0 1 3 4 5 6 7
```

Examples

```plaintext
nx9500-6C8809(config-profile-ProfileNX5500)#show context include-factory | include traffic-shape
traffic-shape priority-map 2 0 1 3 4 5 6 7
traffic-shape class 1 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape class 2 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape class 3 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape class 4 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape activation-criteria always
traffic-shape total-bandwidth 10 Mbps
no traffic-shape enable
```

```plaintext
nx9500-6C8809(config-profile-ProfileNX5500)#traffic-shape enable
nx9500-6C8809(config-profile-ProfileNX5500)#traffic-shape class 1 rate 250 Mbps
nx9500-6C8809(config-profile-ProfileNX5500)#traffic-shape application Bing class 1
```

```plaintext
nx9500-6C8809(config-profile-ProfileNX5500)#show context include-factory | include traffic-shape
traffic-shape priority-map 2 0 1 3 4 5 6 7
traffic-shape class 1 rate 250 Mbps
traffic-shape class 1 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape class 2 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape class 3 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape class 4 max-buffers 35 35 35 30 25 20 15 10
red-level 27 27 27 23 25 20 15 10
traffic-shape activation-criteria always
traffic-shape application Bing class 1
traffic-shape total-bandwidth 200 Mbps
traffic-shape enable
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes traffic shaping configuration or reverts them to the default values</td>
</tr>
</tbody>
</table>
7.1.71 trustpoint (profile-config-mode)

Profile Config Commands

Configures the trustpoint assigned for validating a CMP auth Operator.

A certificate links identity information with a public key enclosed in the certificate.

A CA is a network authority that issues and manages security credentials and public keys for message encryption. The CA signs all digital certificates it issues with its own private key. The corresponding public key is contained within the certificate and is called a CA certificate. A browser must contain the CA certificate in its Trusted Root Library so it can trust certificates signed by the CA's private key.

Depending on the public key infrastructure, the digital certificate includes the owner's public key, the certificate expiration date, the owner's name and other public key owner information.

Each certificate is digitally signed by a trustpoint. The trustpoint signing the certificate can be a certificate authority, corporation or individual. A trustpoint represents a CA/identity pair containing the identity of the CA, CA-specific configuration parameters, and an association with an enrolled identity certificate.

NOTE: Certificates/trustpoints used in this command should be verifiable as existing on the device.

NOTE: For information on configuring trustpoints on a device, see trustpoint (device-config-mode).

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

trustpoint [cmp-auth-operator|https|radius-ca|radius-server] <TRUSTPOINT-NAME>

Parameters

- trustpoint [cmp-auth-operator|https|radius-ca|radius-server] <TRUSTPOINT-NAME>

<table>
<thead>
<tr>
<th>trustpoint</th>
<th>Assigns an existing trustpoint to validate CMP auth operator, client certificates, and RADIUS server certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>https</td>
<td>Assigns an existing trustpoint to validate HTTPS requests</td>
</tr>
<tr>
<td>cmp-auth-operator</td>
<td>Assigns an existing trustpoint to validate CMP auth operator. Once validated, CMP is used to obtain and manage digital certificates in a PKI network. Digital certificates link identity information with a public key enclosed within the certificate, and are issued by the CA. Use this command to specify the CMP-assigned trustpoint. When specified, devices send a certificate request to the CMP supported CA server, and download the certificate directly from the CA server. CMP supports multiple request options through for device communicating to a CMP supported CA server. The device can initiate a request for getting the certificates from the server. It can also auto update the certificates which are about to expire.</td>
</tr>
</tbody>
</table>
### Examples

nx9500-6C8809(config-profile-testNX9000)#trustpoint cmp-auth-operator test

nx9500-6C8809(config-profile-testNX9000)#show context
profile nx9000 testNX9000
  no autoinstall configuration
  no autoinstall firmware
  crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  ...........................................................
  service pm sys-restart
  router bgp
  trustpoint cmp-auth-operator test
nx9500-6C8809(config-profile-testNX9000)#

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes trustpoint-related configurations</td>
</tr>
</tbody>
</table>
7.1.72 tunnel-controller

Profile Config Commands

Configures the tunneled WLAN (extended VLAN) wireless controller or service platform's name

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

tunnel-controller <NAME>

Parameters

- tunnel-controller <NAME>

<table>
<thead>
<tr>
<th>tunnel-controller</th>
<th>Configures the tunneled WLAN (extended VLAN) wireless controller or service platform's name</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;NAME&gt;</td>
<td>- &lt;NAME&gt; – Specify the name.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#tunnel-controller testgroup

Related Commands

| no                | Removes the configured the tunneled WLAN (extended VLAN) wireless controller or service platform's name |
### 7.1.73 use

*Profile Config Commands*

Associates existing policies with this profile. This command is also applicable to the device configuration mode.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax Profiles Mode

```
```

```
use ip/ipv6-access-list <IP/IPv6-ACL-NAME> traffic-shape class <1-4>
```

#### Syntax Device Mode

```
```

---

**NOTE:** The following tables contain the ‘use’ command parameters for the Profile and Device configuration modes.

#### Parameters Profiles Mode


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>use</code></td>
<td>Associates the specified policies with this profile. The specified policies should be existing and configured.</td>
</tr>
<tr>
<td><code>auto-provisioning-policy</code> &lt;POLICY-NAME&gt;</td>
<td>Associates an auto provisioning policy.</td>
</tr>
<tr>
<td><code>&lt;POLICY-NAME&gt;</code></td>
<td>Specifies the auto provisioning policy name.</td>
</tr>
<tr>
<td><code>bonjour-gw-forwarding-policy</code> &lt;POLICY-NAME&gt;</td>
<td>Uses an existing Bonjour GW Forwarding policy with a profile or device.</td>
</tr>
<tr>
<td><code>&lt;POLICY-NAME&gt;</code></td>
<td>Specifies the Bonjour GW Forwarding policy name (should be existing and configured).</td>
</tr>
</tbody>
</table>

**Note:** For more information on Bonjour GW Forwarding policy, see `bonjour-gw-discovery-policy`.  

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bonjour-gw-query-forwarding-policy &lt;POLICY-NAME&gt;</td>
<td>Uses an existing Bonjour GW Query Forwarding policy with a profile or device&lt;br&gt;• &lt;POLICY-NAME&gt; – Specify the Bonjour GW Query Forwarding policy name (should be existing and configured).</td>
</tr>
<tr>
<td>captive-portal server &lt;CAPTIVE-PORTAL&gt;</td>
<td>Configures access to a specified captive portal with this profile&lt;br&gt;• &lt;CAPTIVE-PORTAL&gt; – Specify the captive portal name.</td>
</tr>
<tr>
<td>client-identity-identity-group &lt;CLIENT-IDENTITY-GROUP-NAME&gt;</td>
<td>Associates an existing client identity group with this profile&lt;br&gt;• &lt;CLIENT-IDENTITY-GROUP-NAME&gt; – Specify the client identity group name. &lt;br&gt;Note: For more information on the ‘client-identity’ and ‘client-identity-group’ commands, see client-identity and client-identity-group.</td>
</tr>
<tr>
<td>crypto-cmp-policy &lt;POLICY-NAME&gt;</td>
<td>Associates an existing crypto certificate management protocol (CMP) policy with this profile&lt;br&gt;• &lt;POLICY-NAME&gt; – Specify the CMP policy name. &lt;br&gt;Note: For more information on configuring a crypto CMP policy, see CRYPTO-CMP-POLICY.</td>
</tr>
<tr>
<td>database-client-policy &lt;POLICY-NAME&gt;</td>
<td>Associates an existing database client policy with a profile&lt;br&gt;• &lt;POLICY-NAME&gt; – Specify the policy name (should be existing and configured). &lt;br&gt;Note: For more information on database client policy, see database-client-policy. &lt;br&gt;Note: Applicable only to the VX9000 model virtual machine platform.</td>
</tr>
<tr>
<td>dhcp-server-policy &lt;DHCP-POLICY&gt;</td>
<td>Associates a DHCP server policy&lt;br&gt;• &lt;DHCP-POLICY&gt; – Specify the DHCP server policy name.</td>
</tr>
<tr>
<td>dhcpv6-server-policy &lt;DHCPv6-POLICY&gt;</td>
<td>Associates a DHCPv6 server policy&lt;br&gt;• &lt;DHCPv6-POLICY&gt; – Specify the DHCPv6 server policy name.</td>
</tr>
<tr>
<td>event-system-policy &lt;EVENT-SYSTEM-POLICY&gt;</td>
<td>Associates an event system policy&lt;br&gt;• &lt;EVENT-SYSTEM-POLICY&gt; – Specify the event system policy name.</td>
</tr>
<tr>
<td>firewall-policy &lt;FW-POLICY&gt;</td>
<td>Associates a firewall policy&lt;br&gt;• &lt;FW-POLICY&gt; – Specify the firewall policy name.</td>
</tr>
<tr>
<td>global-association-list server &lt;GLOBAL-ASSOC-LIST-NAME&gt;</td>
<td>Associates the specified global association list with the controller profile&lt;br&gt;• &lt;GLOBAL-ASSOC-LIST-NAME&gt; – Specify the global association list name. &lt;br&gt;Once associated, the controller, using this profile, applies this association list to requests received from all adopted APs. For more information on global association list, see global-association-list.</td>
</tr>
<tr>
<td>guest-management &lt;GUEST-MANAGEMENT-POLICY-NAME&gt;</td>
<td>Associates the specified guest management policy with the controller profile&lt;br&gt;• &lt;GUEST-MANAGEMENT-POLICY-NAME&gt; – Specify the guest management policy name (should be existing and configured).</td>
</tr>
<tr>
<td>ip/ipv6-access-list &lt;IP/IPv6-ACL-NAME&gt; traffic-shape class &lt;1-4&gt;</td>
<td>Associates an IP and/or IPv6 ACL with this profile and applies it as a firewall for the selected traffic-shape class&lt;br&gt;• &lt;IP/IPv6-ACL-NAME&gt; – Specify the IP/IPv6 ACL name (should be existing and configured)&lt;br&gt;• traffic-shape class &lt;1-4&gt; – Selects the traffic-shape class to apply the above specified IP/IPv6 ACL&lt;br&gt;• &lt;1-4&gt; – Select the traffic-shape class from 1 - 4.</td>
</tr>
</tbody>
</table>
### Parameters Device Mode

- **management-policy**
  - Associates a management policy
  - `<MNGT-POLICY>` – Specify the management policy name.

- **radius-server-policy**
  - Associates a device onboard RADIUS policy
  - `<RADIUS-POLICY>` – Specify the RADIUS policy name.

- **role-policy**
  - Associates a role policy
  - `<ROLE-POLICY>` – Specify the role policy name.

- **routing-policy**
  - Associates a routing policy
  - `<ROUTING-POLICY>` – Specify the routing policy name.
  This is not applicable to the NX45XX and NX65XX series profiles.

- **smart-cache-policy**
  - Associates an existing Smart Cache policy with a profile or device
  - `<POLICY-NAME>` – Specify the policy name.

- **web-filter-policy**
  - Associates an existing Web Filter policy with a profile or device
  - `<POLICY-NAME>` – Specify the policy name.

### Parameters Device Mode

- **use**
  - Associates the following policies with this device:
  - `<POLICY-NAME>` – Specify the policy name.

- **auto-provisioning-policy**
  - Associates an auto provisioning policy
  - `<POLICY-NAME>` – Specify the auto provisioning policy name.

- **bonjour-gw-forwarding-policy**
  - Uses an existing Bonjour GW Forwarding policy with a profile or device
  - `<POLICY-NAME>` – Specify the Bonjour GW Forwarding policy name (should be existing and configured).
  
  **Note:** For more information on Bonjour GW Forwarding policy, see `bonjour-gw-discovery-policy`.

- **bonjour-gw-query-forwarding-policy**
  - Uses an existing Bonjour GW Query Forwarding policy with a profile or device
  - `<POLICY-NAME>` – Specify the Bonjour GW Query Forwarding policy name (should be existing and configured).

- **captive-portal**
  - Configures access to a specified captive portal
  - `<CAPTIVE-PORTAL>` – Specify the captive portal name.

- **client-identity-group**
  - Associates an existing client identity group with this device
  - `<CLIENT-IDENTITY-GROUP-NAME>` – Specify the client identity group name.
  
  **Note:** For more information on the ‘client-identity’ and ‘client-identity-group’ commands, see `client-identity` and `client-identity-group`.

- **crypto-cmp-policy**
  - Associates an existing crypto certificate management protocol (CMP) policy
  - `<POLICY-NAME>` – Specify the CMP policy name.
  
  **Note:** For more information on configuring a crypto CMP policy, see `CRYPTO-CMP-POLICY`.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `database-client-policy <POLICY-NAME>` | Associates an existing database client policy with a device  
  - `<POLICY-NAME>` – Specify the policy name (should be existing and configured).  
  **Note:** For more information on database client policy, see `database-client-policy`.  
  **Note:** Applicable only to the NX95XX and VX9000 model service platforms. |
| `database-policy <DATABASE-POLICY-NAME>` | Associates an existing database policy with this device  
  - `<DATABASE-POLICY-NAME>` – Specify the database policy name.  
  **Note:** For more information on configuring a database policy, see `database-policy`. |
| `dhcp-server-policy <DHCP-POLICY>` | Associates a DHCP server policy  
  - `<DHCP-POLICY>` – Specify the DHCP server policy name. |
| `dhcpv6-server-policy <DHCPv6-POLICY>` | Associates a DHCPv6 server policy  
  - `<DHCPv6-POLICY>` – Specify the DHCPv6 server policy name. |
| `enterprise-ui` | Enables application of the site controller’s Enterprise user interface (UI) on all management points (controllers and access points)  
  For example, the site controller is NX5500 and a AP7532 is adopted to it. To enable the access point to also use the Enterprise UI:  
  On the AP7532’s profile configuration mode execute: `use > enterprise-ui`  
  On adoption and application of this profile, the AP7532 access point resets and reboots using the Enterprise UI. Once using the Derepress UI, on all subsequent adoptions, the AP does not get reset. |
| `event-system-policy <EVENT-SYSTEM-POLICY>` | Associates an event system policy  
  - `<EVENT-SYSTEM-POLICY>` – Specify the event system policy name. |
| `firewall-policy <FW-POLICY>` | Associates a firewall policy  
  - `<FW-POLICY>` – Specify the firewall policy name. |
| `global-association-list server <GLOBAL-ASSOC-LIST-NAME>` | Associates the specified global association list with the device (controller)  
  - `<GLOBAL-ASSOC-LIST-NAME>` – Specify the global association list name.  
  Once associated, the controller applies this association list to requests received from all adopted APs. For more information on global association list, see `global-association-list`. |
| `guest-management <GUEST-MANAGEMENT-POLICY-NAME>` | Associates the specified guest management policy with this device  
  - `<GUEST-MANAGEMENT-POLICY-NAME>` – Specify the guest management policy name (should be existing and configured). |
| `ip/ipv6-access-list <IP/IPv6-ACL-NAME> traffic-shape class <1-4>` | Associates an IP and/or IPv6 ACL with this device and applies it as a firewall for a selected traffic-shape class  
  - `<IP/IPv6-ACL-NAME>` – Specify the IP/IPv6 ACL name (should be existing and configured)  
  - `traffic-shape class <1-4>` – Selects the traffic-shape class to apply the above specified IP/IPv6 ACL  
  - `<1-4>` – Select the traffic-shape class from 1 - 4. |
| `license <WORD>` | Associates a Web filtering license with this device  
  - `<WORD>` – Provide a 256 character maximum license string for the Web filtering feature. Web filtering is used to restrict access to specific resources on the Internet. |
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>management-policy</td>
<td>Associates a management policy</td>
<td>- <code>&lt;MNGT-POLICY&gt;</code> -- Specify the management policy name.</td>
</tr>
<tr>
<td>nsight-policy</td>
<td>Associates a specified Nsight (MART) policy with this device</td>
<td>- <code>&lt;NSIGHT-POLICY-NAME&gt;</code> -- Specify the Nsight policy name (should be existing and configured).</td>
</tr>
<tr>
<td>profile</td>
<td>Associates a profile with this device</td>
<td>- <code>&lt;PROFILE-NAME&gt;</code> -- Specify the profile name.</td>
</tr>
<tr>
<td>radius-server-policy</td>
<td>Associates a device onboard RADIUS policy</td>
<td>- <code>&lt;RADIUS-POLICY&gt;</code> -- Specify the RADIUS policy name.</td>
</tr>
<tr>
<td>rf-domain</td>
<td>Associates an RF Domain</td>
<td>- <code>&lt;RF-DOMAIN-NAME&gt;</code> -- Specify the RF Domain name.</td>
</tr>
<tr>
<td>role-policy</td>
<td>Associates a role policy</td>
<td>- <code>&lt;ROLE-POLICY&gt;</code> -- Specify the role policy name.</td>
</tr>
<tr>
<td>routing-policy</td>
<td>Associates a routing policy</td>
<td>- <code>&lt;ROUTING-POLICY&gt;</code> -- Specify the routing policy name.</td>
</tr>
<tr>
<td>rtl-server-policy</td>
<td>Associates a Real Time Locationing (RTL) server policy with an access point</td>
<td>- <code>&lt;POLICY-NAME&gt;</code> -- Specify the RTL server policy name (should be existing and configured).</td>
</tr>
<tr>
<td>sensor-policy</td>
<td>Associates a sensor policy with an access point or controller</td>
<td>- <code>&lt;POLICY-NAME&gt;</code> -- Specify the sensor policy name (should be existing and configured).</td>
</tr>
<tr>
<td>wips-policy</td>
<td>Associates a WIPS policy</td>
<td>- <code>&lt;WIPS-POLICY&gt;</code> -- Specify the WIPS policy name.</td>
</tr>
<tr>
<td>smart-cache-policy</td>
<td>Associates an existing Smart Cache policy with a profile or device</td>
<td>- <code>&lt;POLICY-NAME&gt;</code> -- Specify the policy name.</td>
</tr>
<tr>
<td>web-filter-policy</td>
<td>Associates an existing Web Filter policy with a profile or device</td>
<td>- <code>&lt;POLICY-NAME&gt;</code> -- Specify the policy name.</td>
</tr>
</tbody>
</table>

**Note:** Use this command to associate an Nsight policy to a controller to enable it to function as the NSight server. For more information, see `<nsight-policy>`. This command is specific to the NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, and NX9510 model devices.
Examples

rfs7000-37FABE(config-profile-default-rfs7000)#use event-system-policy TestEventSysPolicy

rfs7000-37FABE(config-profile-default-rfs7000)#show context profile rfs7000 default-rfs7000
mint link ip 1.2.3.4
mint level 1 area-id 88

interface ge3
  ip dhcp trust
  qos trust dscp
  qos trust 802.1p
interface ge4
  ip dhcp trust
  qos trust dscp
  qos trust 802.1p
interface pppoe1
  use event-system-policy TestEventSysPolicy
  use firewall-policy default
  ntp server 172.16.10.10 prefer version 1
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disassociates a specified policy from this profile</td>
</tr>
</tbody>
</table>
### 7.1.74 vrrp

**Profile Config Commands**

> Configures VRRP group settings

A default gateway is a critical resource for connectivity. However, it is prone to a single point of failure. Thus, redundancy for the default gateway is required. If WAN backhaul is available, and a router failure occurs, then the controller should act as a router and forward traffic on to its WAN link.

Define an external VRRP configuration when router redundancy is required in a network requiring high availability.

Central to VRRP configuration is the election of a VRRP master. A VRRP master (once elected) performs the following functions:

- Responds to ARP requests
- Forwards packets with a destination link layer MAC address equal to the virtual router’s MAC address
- Rejects packets addressed to the IP address associated with the virtual router, if it is not the IP address owner
- Accepts packets addressed to the IP address associated with the virtual router, if it is the IP address owner or accept mode is true.

The nodes that lose the election process enter a backup state. In the backup state they monitor the master for any failures, and in case of a failure one of the backups, in turn, becomes the master and assumes the management of the designated virtual IPs. A backup does not respond to an ARP request, and discards packets destined for a virtual IP resource.

**Supported in the following platforms:**

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
vrrp [<1-255>|version]
vrrp <1-255> [delta-priority|description|interface|ip|monitor|preempt|priority|
  sync-group|timers]
vrrp <1-255> [delta-priority <1-253>|description <LINE>|ip <IP> {<IP>}]
  preempt {delay <1-65535>}|priority <1-254>|sync-group]
vrrp <1-255> interface vlan <1-4094>
vrrp <1-255> monitor [<IF-NAME>|critical-resource|pppoel|vlan|wwan1]
vrrp <1-255> monitor [<IF-NAME]|pppoel|vlan <1-4094>|wwan1] {(<IF-NAME>|
critical-resource|pppoel|vlan|wwan1)}
vrrp <1-255> monitor critical-resource <CRM-NAME1> <CRM-NAME2> <CRM-NAME3> <CRM-NAME4>
  [action [decrement-priority|increment-priority]] {<IF-NAME>|pppoel|vlan|wwan1})
vrrp <1-255> timers advertise [<1-255]|centiseconds <25-4095>|msec <250-999>]
vrrp version [2|3]
```

**Parameters**

- vrrp <1-255> [delta-priority <1-253>|description <LINE>|vrrp ip <IP> {<IP>}]
  preempt {delay <1-65535>}|priority <1-254>|sync-group]

<p>| vrrp &lt;1-255&gt; | Configures the virtual router ID from 1-255. Identifies the virtual router the packet is reporting status for. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>delta-priority &lt;1-253&gt;</td>
<td>Configures the priority to decrement (local link monitoring and critical resource monitoring) or increment (critical resource monitoring). When the monitored interface is down, the configured priority decrements by a value defined by the delta-priority option. When monitoring critical resources, the value increments by the delta-priority option.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-253&gt; – Specify the delta priority level from 1-253.</td>
</tr>
<tr>
<td>description &lt;LINE&gt;</td>
<td>Configures a text description for the virtual router to further distinguish it from other routers with similar configuration.  Adam: &lt;LINE&gt; – Provide a description (a string from 1-64 characters in length)</td>
</tr>
<tr>
<td>ip &lt;IP-ADDRESSES&gt;</td>
<td>Identifies the IP address(es) backed by the virtual router. These are IP addresses of Ethernet switches, routers, and security appliances defined as virtual router resources.</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP-ADDRESSES&gt; – Specify the IP address(es) in the A.B.C.D format.  This configuration triggers VRRP operation.</td>
</tr>
<tr>
<td>preempt</td>
<td>Controls whether a high priority backup router preempts a lower priority master. This field determines if a node with higher priority can takeover all virtual IPs from a node with lower priority. This feature is disabled by default.</td>
</tr>
<tr>
<td></td>
<td>• delay – Optional. Configures the pre-emption delay timer from 1 - 65535 seconds (default is 0 seconds). This option can be used to delay sending out the master advertisement or, in case of monitored link coming up, adjusting the VRRP priority by priority delta.</td>
</tr>
<tr>
<td>priority &lt;1-254&gt;</td>
<td>Configures the priority level of the router within a VRRP group. This value determines which node is elected as the Master. Higher values imply higher priority, value 254 has the highest precedence (default is 100).</td>
</tr>
<tr>
<td>sync-group</td>
<td>Adds this VRRP group to a synchronized group. To trigger VRRP failover, it is essential all individual groups within a synchronized group have failover. VRRP failover is triggered if an advertisement is not received from the virtual masters that are part of this VRRP sync group. This feature is disabled by default.</td>
</tr>
</tbody>
</table>

- `vrrp <1-255> interface vlan <1-4094>`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vrrp &lt;1-255&gt;</td>
<td>Configures the virtual router ID from 1-255. Identifies the virtual router the packet is reporting status for.</td>
</tr>
<tr>
<td>interface</td>
<td>Enables VRRP on the specified switch VLAN interface (SVI)</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>• vlan &lt;1-4094&gt; – Specify the VLAN interface ID from 1 - 4094.</td>
</tr>
</tbody>
</table>

- `vrrp <1-255> monitor critical-resource <CRM-NAME1> <CRM-NAME2> <CRM-NAME3> <CRM-NAME4> (action [decrement-priority|increment-priority] {<IF-NAME|pppoe1|vlan|wwan1})`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vrrp &lt;1-255&gt;</td>
<td>Configures the virtual router ID from 1-255. Identifies the virtual router the packet is reporting status for.</td>
</tr>
<tr>
<td>monitor</td>
<td>Enables link monitoring or Critical Resource Monitoring (CRM)</td>
</tr>
<tr>
<td>critical-resource</td>
<td>Specifies the name of the critical resource to monitor. VRRP can be configured to monitor maximum of four critical resources. Use the &lt;CRM-NAME2&gt;, &lt;CRM-NAME3&gt;, and &lt;CRM-NAME4&gt; to provide names of the remaining three critical resources.</td>
</tr>
<tr>
<td>&lt;CRM-NAME1&gt;</td>
<td>By default VRRP is configured to monitor all critical resources on the device.</td>
</tr>
</tbody>
</table>
action [decrement-priority | increment-priority]

Sets the action on critical resource down event. It is a recursive parameter that sets
the action for each of the four critical resources being monitored.

- decrement-priority – Decrements the priority of virtual router on critical resource
down event
- increment-priority – Increments the priority of virtual router on critical resource down
event

<IF-NAME>

Optional. Enables interface monitoring

- <IF-NAME> – Specify the interface name to monitor

ppoe1

Optional. Enables Point-to-Point Protocol (PPP) over Ethernet interface monitoring

vlan <1-4094>

Optional. Enables VLAN (switched virtual interface) interface monitoring

- <1-4094> – Specify the VLAN interface ID from 1- 4094.

wwan1

Optional. Enables Wireless WAN interface monitoring

vrrp <1-255> timers advertise [<1-255>|centiseconds <25-4095>|msec <250-999>]

Configures the VRRP advertisements time interval. This is the interval at which a
master sends out advertisements on each of its configured VLANs.

- <1-255> – Configures the timer interval from 1- 255 seconds. (applicable for VRRP
version 2 only)
- centiseconds <25-4095> – Configures the timer interval in centiseconds (1/100th of
a second). Specify a value between 25 - 4095 centiseconds (applicable for VRRP
version 3 only).
- msec <250-999> – Configures the timer interval in milliseconds (1/1000th of a
second). Specify a value between 250 - 999 msec (applicable for VRRP version 2
only).

Default is 1 second.

vrrp version [2|3]

Configures one of the following VRRP versions:

- 2 – VRRP version 2 (RFC 3768). This is the default setting.
- 3 – VRRP version 3 (RFC 5798 only IPV4)

The VRRP version determines the router redundancy. Version 3 supports sub-second
(subcentisecond) VRRP failover and support services over virtual IP.

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#vrrp version 3
rfs7000-37FABE(config-profile-default-rfs7000)#vrrp 1 sync-group
rfs7000-37FABE(config-profile-default-rfs7000)#vrrp 1 delta-priority 100
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
  ......................................................
  vrrp 1 timers advertise 1
  vrrp 1 preempt
  vrrp 1 sync-group
  vrrp 1 delta-priority 100
  vrrp version 3
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Reverts VRRP settings</td>
</tr>
</tbody>
</table>
### 7.1.75 vrrp-state-check

**Profile Config Commands**

Publishes interface via OSPF or BGP based on *Virtual Router Redundancy Protocol* (VRRP) status.

VRRP allows automatic assignment of available IP routers to participating hosts. This increases the availability and reliability of routing paths via automatic default gateway selections on an IP subnetwork. This option is enabled by default.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

```
vrrp-state-check
```

**Parameters**

None

**Examples**

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#vrrp-state-check
```

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#show context
```

```
nx9000 B4-C7-99-6C-88-09
use profile default-nx9000
use rf-domain default
```

```
..................  ..............................................................
          ip default-gateway priority 7500
          bgp-route-limit num-routes 10 retry-count 5 retry-timeout 60 reset-time 360
          vrrp-state-check
          controller adopted-devices controllers
          alias string $SN B4C7996C8809
```

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the publishing of an interface via OSPF/BGP based on VRRP status</td>
</tr>
</tbody>
</table>
7.1.76 wep-shared-key-auth

Profile Config Commands

Enables support for 802.11 WEP shared key authentication

When enabled, devices, using this profile, use a WEP key to access the network. The controller or service platform use the key algorithm to convert an ASCII string to the same hexadecimal number. Clients without the recommended adapters need to use WEP keys manually configured as hexadecimal numbers. This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

wep-shared-key-auth

Parameters

None

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#wep-shared-key-auth

rfs7000-37FABE(config-profile-default-rfs7000)#show context

profile rfs7000 default-rfs7000

bridge vlan 1

bridging-mode isolated-tunnel

ip igmp snooping

ip igmp snooping querier

wep-shared-key-auth

autoinstall configuration

autoinstall firmware

crypto ikev1 policy ikev1-default

isakmp-proposal default encryption aes-256 group 2 hash sha

crypto ikev2 policy ikev2-default

isakmp-proposal default encryption aes-256 group 2 hash sha

crypto ipsec transform-set default esp-aes-256 esp-sha-hmac

crypto ikev1 remote-vpn

crypto ikev2 remote-vpn

crypto auto-ipsec-secure

interface mel

interface gel

ip dhcp trust

qos trust dscp

qos trust 802.1p

interface ge2

ip dhcp trust

---More---

rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

no

Disable support for 802.11 WEP shared key authentication
7.1.77 service

Profile Config Commands

Service commands are used to view and manage configurations. The service commands and their corresponding parameters vary from mode to mode.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
service [captive-portal-server|cluster|critical-resource|fast-switching|enable|
global-association-list|lldp|memory|meshpoint|pm|power-config|radius|remote-config|
rss-timeout|watchdog|wireless|show]
```

```
service captive-portal-server connections-per-ip <3-64>

service cluster master-election immediate

service critical-resource port-mode-source-ip <IP>

service enable [l2tpv3|pppoe|radiusd]

service global-association-list blacklist-interval <1-65535>

service lldp loop-detection

service memory kernel decrease

service meshpoint loop-prevention-port [<L2-INTERFACE-NAME>|ge <1-5>|
port-channel <1-2>|up1]

service pm sys-restart

service power-config [3af-out|force-3at]

service radius dynamic-authorization additional-port <1-65535>

service remote-config apply-delay <0-600>

service rss-timeout <0-86400>

service watchdog

service wireless [anqp-frag-always|anqp-frag-size|ap650|client|cred-cache-sync|
inter-ap-key|noise-immunity|reconfig-on-tx-stall|test|wispe-controller-port]

service wireless anqp-frag-always

service wireless anqp-frag-size <100-1500>

service wireless ap650 legacy-auto-update-image <FILE>

service wireless client tx-deauth on-radar-detect

service wireless cred-cache-sync [full|interval <30-864000>|never|partial]

service wireless test [max-rate|max-reties|min-rate]

service wireless test [max-rate|min-rate] [1,2,5.5,6,11,12,18,24,36,48,54,mcs0,
mcs1,...........,mcs23]

service wireless inter-ap-key [0 <WORD>|2 <WORD>|<WORD>]

service wireless noise-immunity

service wireless reconfig-on-rx-stall

service wireless test max-reties <0-15>

service wireless wispe-controller-port <1-65535>

service show cli
The following command is specific to the NX45XX and NX65XX series service platform:

```
service fast-switching
```

### Parameters

- **service captive-portal-server connections-per-ip <3-64>**
  - Configures the maximum number of simultaneous captive portal connection allowed per IP address
  - `<3-64>` – Specify the maximum number of connections per IP address from 3 - 64.
  - The default is 3.
  - **Note:** This command is applicable only to the NX9XXX and NX9600 service platform profiles.

- **service cluster master-election immediate**
  - Initiates and completes cluster master election as soon as just one cluster member comes on and is active. This option is disabled by default.

- **service critical-resource port-mode-source-ip <IP>**
  - Hard codes a source IP for critical resource management
  - The default is 0.0.0.0
  - Use this option to define the IP address used as the source address in ARP packets used to detect a critical resource on a layer 2 interface. By default, the source address used in ARP packets to detect critical resources is 0.0.0.0. However, some devices do not support the above IP address and drop the ARP packets. Use this field to provide an IP address specifically used for this purpose. The IP address used for port-mode-source-ip monitoring must be different from the IP address configured on the device.

- **service enable [l2tpv3|pppoe|radiusd]**
  - Enables L2TPv3 on this profile
  - The L2TPV3 enable/disable option is not supported on AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000 model devices.
  - **Note:** It is supported only on AP621, AP6511, and AP6521.

- **service enable pppoe**
  - Enables PPPoE features. When executed on a device, enables PPPoE on the logged device. When executed on a profile, enables PPPoE on all devices using that profile.

- **service enable radiusd**
  - Enables RADIUS features. When executed on a device, enables RADIUS on the logged device. When executed on a profile, enables RADIUS on all devices using that profile.

- **service global-association-list blacklist-interval <1-65535>**
  - Configures global association list related parameters
  - Configures the period for which a client is blacklisted. A client is considered blacklisted after being denied access by the server.
  - `<1-65535>` – Specify a value from 1 - 65535 seconds. The default is 60 seconds.

- **service lldp loop-detection**
  - Enables network loop detection via LLDP. This option is disabled by default.
### Profiles 7-453

**service memory kernel decrease**

Enables reduction in kernel memory usage. When enabled, firewall flows are reduced by 75% resulting in reduced kernel memory usage. A reboot is required for the option to take effect.

This option is disabled by default.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>meshpoint loop-prevention-port</td>
<td>Limits meshpoint loop prevention to a single port</td>
</tr>
<tr>
<td>&lt;L2-INTERFACE-NAME&gt;</td>
<td>Limits meshpoint loop prevention on a specified Ethernet interface</td>
</tr>
<tr>
<td>ge &lt;1-4&gt;</td>
<td>Limits meshpoint loop prevention on a specified GigabitEthernet interface</td>
</tr>
<tr>
<td>port-channel &lt;1-2&gt;</td>
<td>Limits meshpoint loop prevention on a specified port-channel interface</td>
</tr>
<tr>
<td>pm sys-restart</td>
<td>Enables the process monitor (PM) to restart the system when a process fails. This option is enabled by default.</td>
</tr>
<tr>
<td>power-config 3af-out</td>
<td>Enables LLDP power negotiation, but uses 3af power. This option is disabled by default.</td>
</tr>
<tr>
<td>power-config force-3at</td>
<td>Disables LLDP negotiation and forces 802.3at power configuration. This option is disabled by default.</td>
</tr>
<tr>
<td>radius dynamic-authorization additional-port &lt;1-65535&gt;</td>
<td>Configures an additional UDP port used by the device to listen for dynamic authorization messages</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-65535&gt; – Specify a value from 1 - 65535. The default is 3799. The Cisco Identity Services Engine (ISE) server uses port 1700.</td>
</tr>
<tr>
<td>remote-config apply-delay &lt;0-600&gt;</td>
<td>Delays configuration of a remote device (after it becomes active) by the specified time period</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-600&gt; – Specify a value from 0 - 600 seconds. The default is 0 seconds.</td>
</tr>
<tr>
<td>rss-timeout &lt;0-86400&gt;</td>
<td>Configures the duration, in seconds, for which an adopted access point will continue to provide wireless functions even after loosing controller adoption.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-86400&gt; – Specify a value from 0 - 86400 seconds. The default is 300 seconds.</td>
</tr>
</tbody>
</table>
### Service Watchdog

**service watchdog**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables the watchdog. This feature is enabled by default.</td>
<td>Enabling the watchdog option implements heartbeat messages to ensure other associated devices are up and running and capable of effectively inter-operating with the controller.</td>
</tr>
</tbody>
</table>

### Service Wireless ANQP-Frag-Always

**service wireless anqp-frag-always**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables fragmentation of all ANQP packets. This option is disabled by default.</td>
<td></td>
</tr>
</tbody>
</table>

### Service Wireless ANQP-Frag-Size 100-1500

**service wireless anqp-frag-size <100-1500>**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures the ANQP packet fragment size</td>
<td>• <code>&lt;100-1500&gt;</code> – Specify a value from 100 - 1500. The default is 1200.</td>
</tr>
</tbody>
</table>

### Service Wireless AP650 Legacy-Auto-Update-Image <FILE>

**service wireless ap650 legacy-auto-update-image <FILE>**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invokes AP650 related service commands</td>
<td>Configures the AP650 image file details, such as location and file name</td>
</tr>
</tbody>
</table>

### Service Wireless Cred-Cache-Sync [Full|Interval <30-864000>|Never|Partial]

**service wireless cred-cache-sync [full|interval <30-864000>|never|partial]**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures the credential cache’s synchronization parameters. The parameters are: full, interval, never, and partial.</td>
<td>Enables synchronization of all credential cache entries</td>
</tr>
</tbody>
</table>

### Service Wireless TX-Deauth On-Radar-Detection

**service wireless client tx-deauth on-radar-detection**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables access points to transmit deauth to clients when changing channels on radar detection. This option is enabled by default.</td>
<td></td>
</tr>
</tbody>
</table>

### Service Wireless Inter-AP-Key [0 <WORD>|2 <WORD>|<WORD>]

**service wireless inter-ap-key [0 <WORD>|2 <WORD>|<WORD>]**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configure encryption key used for securing inter-ap messages. This option is disabled by default.</td>
<td>Specify a clear text or encrypted key.</td>
</tr>
</tbody>
</table>
- **service wireless noise-immunity**
  
  | noise-immunity | Polls for status and reconfigures radio in case of receive stall. This option is enabled by default. |

- **service wireless reconfig-on-rx-stall**
  
  | reconfig-on-rx-stall | Enables noise immunity on the radio |

- **service wireless test** `[max-rate|min-rate]` `[1,2,5.5,6,11,12,18,24,36,48,54,mcs0, mcs1,...........,mcs23]`
  
  | test | Configures the serviceability parameters used for testing |
  | [max-rate|min-rate] | Configures the maximum and minimum data rates for clients using rate-scaling. The 'max-rate' and min-rate' options are disabled by default. |
  | [1,2,5.5,.....mcs23] | Select the maximum and minimum data rates applicable. |

- **service wireless test max-retries <0-15>**
  
  | test | Configures the serviceability parameters used for testing |
  | max-retries <0-15> | Configures the maximum number of retries per packet from 0 - 15. The default is 0. |

- **service wireless wispe-controller-port <1-65535>**
  
  | wispe-controller-port | Resets the Wireless Switch Protocol Enhanced (WISPe) controller port. This is the UDP port used to listen for WISPe. |
  | <1-65535> | • <1-65535> – Specify a value from 1 - 65535. The default is 24756. |

- **service show cli**
  
  | show cli | Displays running system configuration details |
  | | • cli – Displays the CLI tree of the current mode |

- **service fast-switching**
  
  | fast-switching | Enables fast switching of packets in the hardware |
  | | Use the no > service > fast-switching command to disable this feature. |
  | | Fast switching can be enabled and disabled on the NX45XX and NX65XX series service platform. |

**Examples**

```
rfs7000-37FABE(config-profile-testrfs7000)#service radius dynamic-authorization additional-port 1700
rfs7000-37FABE(config-profile-testrfs7000)#show context
profile rfs7000 test
  service radius dynamic-authorization additional-port 1700
  no autoinstall configuration
  no autoinstall firmware
  crypto ikev1 policy ikev1-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ikev2 policy ikev2-default
  isakmp-proposal default encryption aes-256 group 2 hash sha
  crypto ipsec transform-set default esp-aes-256 esp-sha-hmac
  crypto ikev1 remote-vpn
  crypto ikev2 remote-vpn
--More--
rfs7000-37FABE(config-profile-testrfs7000)#
```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes or resets service command parameters</td>
</tr>
</tbody>
</table>
7.1.78 slot

Profile Config Commands

Assigns a Peripheral Component Interconnect expansion (PCIe) slot for Team-URC VM or WiNG support. The NX45XX and NX65XX series service platforms support an optional NX expansion module for modular WAN and Telephony Gateway support. The NX Series Expansion Module kit (KT-NXMODC-01) allows for the installation and implementation of up to four PCIe cards. The Expansion Module kit can be installed in NX4500, NX4524, NX6500 or NX6524 model service platforms.

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax
slot <1-4>

Parameters
- slot <1-4>

Enables assignment of PCIe slots for TEAM-Centro or WiNG support. You can also assign the selected slot to any other VM.
- <1-4> – Select the slot from 1 - 4. The command selects the slot and enters its configuration mode.

In the slot configuration mode, do the following:
- assign – Assigns the selected slot to either TEAM-Centro VM, WiNG, or other VM support
  - team-centro – Assigns the selected slot to TEAM-Centro VM (IP PBX)
  - wing – Assigns the selected slot to WiNG
  - other – Assigns the selected slot to other VM

Note: The show > slot command displays slots and their assignment details (type and status). Use the no > assign command to override the slot assignment configured.

Examples
nx4500-5CFA2B(config-profile-testNX45XX)#slot 1
nx4500-5CFA2B(config-profile testNX45XX-slot-1)#
nx4500-5CFA2B(config-profile testNX45XX-slot-1)#?

Slot Mode commands:
- assign Assign the slot
- no Negate a command or set its defaults
- shutdown Disable the slot
- clrscr Clears the display screen
- commit Commit all changes made in this session
- do Run commands from Exec mode
- end End current mode and change to EXEC mode
- exit End current mode and down to previous mode
- help Description of the interactive help system
- revert Revert changes
- service Service Commands
- show Show running system information
- write Write running configuration to memory or terminal

nx4500-5CFA2B(config-profile testNX45XX-slot-1)#
nx4500-5CFA2B(config-profile testNX45XX-slot-1)#assign team-centro
nx4500-5CFA2B(config-profile testNX45XX-slot-1)#show context
slot 1
    assign team-centro

nx4500-5CFA2B(config-device B4-C7-99-5C-FA-2B-slot-1)# show slot
-----------------------------------
SLOT TYPE     MODULE      STATUS
-----------------------------------
1    []   team-centro   Enabled
2    []   wing          Enabled
3    []   wing          Enabled
4    []   wing          Enabled
-----------------------------------
nx4500-5CFA2B(config-device B4-C7-99-5C-FA-2B-slot-1)#

nx4500-5CFA2B(config-profile testNX45XX-slot-1)#no assign

nx4500-5CFA2B(config-profile testNX45XX-slot-1)#show context
slot 1

Use the shutdown option to shut down the selected slot.

nx4500-5CFA2B(config-profile testNX45XX-slot-1)#shutdown

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the PCI expansion slot assignment for Team-URC VM or WiNG support</td>
</tr>
</tbody>
</table>
### 7.2 Device Config Commands

Use the (config) instance to configure device specific parameters.

To navigate to this instance, use the following commands:

```plaintext
<DEVICE> (config)#<DEVICE-TYPE> <MAC>
<DEVICE> (config-device-<MAC>)#?
```

**Device Mode commands:**

- **adopter-auto-provisioning-policy-lookup**: Use centralized auto-provisioning policy when adopted by another controller.
- **adoption**: Adoption configuration.
- **adoption-mode**: Configure the adoption mode for the access-points in this RF-Domain.
- **adoption-site**: Set system's adoption site.
- **alias**: Alias.
- **application-policy**: Application Policy configuration.
- **area**: Set name of area where the system is located.
- **arp**: Address Resolution Protocol (ARP).
- **auto-learn**: Auto learning.
- **autogen-uniqueid**: Autogenerate a unique id.
- **autoinstall**: Autoinstall settings.
- **bridge**: Ethernet bridge.
- **captive-portal**: Captive portal.
- **cdp**: Cisco Discovery Protocol.
- **channel-list**: Configure channel list to be advertised to wireless clients.
- **cluster**: Cluster configuration.
- **configuration-persistence**: Enable persistence of configuration across reloads (startup config file).
- **contact**: Configure the contact.
- **controller**: WLAN controller configuration.
- **country-code**: Configure the country of operation.
- **critical-resource**: Critical Resource.
- **crypto**: Encryption related commands.
- **database**: Database command.
- **device-upgrade**: Device firmware upgrade.
- **dot1x**: 802.1X.
- **dpi**: Enable Deep-Packet-Inspection (Application Assurance).
- **dscp-mapping**: Configure IP DSCP to 802.1p priority mapping for untagged frames.
- **email-notification**: Email notification configuration.
- **enforce-version**: Check the firmware versions of devices before interoperating.
- **environmental-sensor**: Environmental Sensors Configuration.
- **events**: System event messages.
- **export**: Export a file.
- **file-sync**: File sync between controller and adoptees.
- **floor**: Set the floor within a area where the system is located.
- **geo-coordinates**: Configure geo coordinates for this device.
- **gre**: GRE protocol.
- **hostname**: Set system's network name.
- **http-analyze**: Specify HTTP-Analysis configuration.
- **interface**: Select an interface to configure.
- **ip**: Internet Protocol (IP).
- **ipv6**: Internet Protocol version 6 (IPv6).
- **l2tpv3**: L2tpv3 protocol.
- **l3e-lite-table**: L3e lite Table.
- **layout-coordinates**: Configure layout coordinates for this device.
led                                      Turn LEDs on/off on the device
led-timeout                              Configure the time for the led to
turn off after the last radio state
change
legacy-auto-downgrade                    Enable device firmware to auto
downgrade when other legacy devices
are detected
legacy-auto-update                       Auto upgrade of legacy devices
license                                  License management command
lldp                                     Link Layer Discovery Protocol
load-balancing                           Configure load balancing parameter
location                                 Configure the location
logging                                  Modify message logging facilities
mac-address-table                        MAC Address Table
mac-auth                                 Configure MAC address to name
mac-name                                 memory-profile
management-server                        Memory profile to be used on the
device
meshpoint-device                         Configure meshpoint device
parameters
meshpoint-monitor-interval               Configure meshpoint monitoring
interval
min-misconfiguration-recovery-time       Check controller connectivity after
configuration is received
mint                                     MiNT protocol
mirror                                   Mirroring
misconfiguration-recovery-time           Check controller connectivity after
configuration is received
mpact-server                             MPACT server configuration
neighbor-inactivity-timeout              Configure neighbor inactivity
timeout
neighbor-info-interval                   Configure neighbor information
exchange interval
no                                       Negate a command or set its
defaults
noc                                      Configure the noc related setting
nsight                                   NSight
ntp                                      Ntp server A.B.C.D
offline-duration                         Set duration for which a device
remains unadopted before it
generates offline event
override-wlan                            Configure RF Domain level overrides
for wlan
power-config                             Configure power mode
preferred-controller-group               Controller group this system will
prefer for adoption
preferred-tunnel-controller             Tunnel Controller Name this system
will prefer for tunneling extended
vlan traffic
radius                                   Configure device-level radius
authentication parameters
raid                                     RAID
remove-override                          Remove configuration item override
from the device (so profile value
takes effect)
rf-domain-manager                        RF Domain Manager
router                                   Dynamic routing
rsa-key                                  Assign a RSA key to a service
sensor-server                            AirDefense sensor server
slot                                     PCI expansion Slot
spanning-tree                            Spanning tree
timezone                                 Configure the timezone
traffic-class-mapping                    Configure IPv6 traffic class to
802.1p priority mapping for
untagged frames
traffic-shape                            Traffic shaping
trustpoint                               Assign a trustpoint to a service
tunnel-controller                       Tunnel Controller group this
use                                     controller belongs to
vrrp                                    Set setting to use
vrrp-state-check                        VRRP configuration
wep-shared-key-auth                     Publish interface via OSPF/BGP only
                                       if the interface VRRP state is not
                                       BACKUP
clrscr                                   Enable support for 802.11 WEP
commit                                   shared key authentication
do                                       clears the display screen
end                                      Commit all changes made in this
exit                                     session
help                                     Run commands from Exec mode
                                       End current mode and change to EXEC
                                       mode
                                       End current mode and down to
                                       previous mode
revert                                   Description of the interactive help
                                       system
service                                   Revert changes
show                                     Service Commands
write                                    Show running system information
                                       Write running configuration to
                                       memory or terminal

<DEVICE>{config-device-<MAC>}#

The following table summarizes device configuration mode commands:

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<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
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</thead>
<tbody>
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<td>Enables the use of a centralized auto provisioning policy on this device</td>
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<tr>
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<td>page 7-12</td>
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<tr>
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<td></td>
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<tr>
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<tr>
<td>alias</td>
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</tr>
<tr>
<td>application-policy</td>
<td>Associates a RADIUS server provided application policy with this</td>
<td>page 7-19</td>
</tr>
<tr>
<td></td>
<td>device. When associated, the application policy allows wireless clients</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(MUs) to always find the RADIUS-supplied application policy in the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dataplane.</td>
<td></td>
</tr>
<tr>
<td>area</td>
<td>Sets the name of area where the system is deployed</td>
<td>page 7-467</td>
</tr>
<tr>
<td>arp</td>
<td>Configures ARP parameters</td>
<td>page 7-21</td>
</tr>
<tr>
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<td>Enables controllers or service platforms to maintain a local</td>
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<tr>
<td></td>
<td>configuration record of devices requesting adoption and provisioning. The</td>
<td></td>
</tr>
<tr>
<td></td>
<td>command also enables learning of a device’s host name via DHCP options.</td>
<td></td>
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<tr>
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<td>page 7-24</td>
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<tr>
<td></td>
<td>unique ID for the logged device</td>
<td></td>
</tr>
<tr>
<td>autoinstall</td>
<td>Autoinstalls firmware image and configuration setup parameters</td>
<td>page 7-26</td>
</tr>
<tr>
<td>bridge</td>
<td>Configures Ethernet Bridging parameters</td>
<td>page 7-27</td>
</tr>
</tbody>
</table>
### Table 7.24 Device Config Mode Commands

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<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
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<tr>
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</tr>
<tr>
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<tr>
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</tr>
<tr>
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<tr>
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<td>Configures wireless controller or service platform’s country code</td>
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</tr>
<tr>
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<td>Configures data encryption protocols and settings</td>
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<td>page 7-133</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Configures device firmware upgrade settings on this device</td>
<td>page 7-134</td>
</tr>
<tr>
<td>dot1x</td>
<td>Configures 802.1x standard authentication controls</td>
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</tr>
<tr>
<td>dpi</td>
<td>Enables Deep Packet Inspection (DPI) on this device</td>
<td>page 7-138</td>
</tr>
<tr>
<td>dscp-mapping</td>
<td>Configures IP Differentiated Services Code Point (DSCP) to 802.1p priority mapping for untagged frames</td>
<td>page 7-140</td>
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<td>Configures e-mail notification settings</td>
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<tr>
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<td>page 7-144</td>
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<tr>
<td>events</td>
<td>Enables system event message generation and forwarding</td>
<td>page 7-146</td>
</tr>
<tr>
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<td>Enables export of startup.log file after every boot</td>
<td>page 7-147</td>
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<tr>
<td>file-sync</td>
<td>Configures parameters enabling synching of PKCS#12 certificate between the staging-controller and adoptee AP6522/AP6562 client bridges</td>
<td>page 7-148</td>
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<td>Sets the floor name where the system is located</td>
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<td>Configures the geographic coordinates for this device</td>
<td>page 7-472</td>
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<td>page 7-151</td>
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</tr>
<tr>
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<td>Description</td>
<td>Reference</td>
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<td>Configures L3e Lite Table with this profile</td>
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<td>Configures layout coordinates</td>
<td>page 7-474</td>
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<td>Turns LEDs on or off</td>
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<td>Configures the LED-timeout timer in the device or profile configuration mode</td>
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<td>legacy-auto-downgrade</td>
<td>Enables legacy device firmware to auto downgrade</td>
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<td>legacy-auto-update</td>
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<td>Adds device feature licenses</td>
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<td>Configures load balancing parameters.</td>
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<td>Configures the system’s location (place of deployment)</td>
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<td>Configures MAC address to device name mappings</td>
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<td>Configures a management server with this profile</td>
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<td>Configures memory profile used on the device</td>
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<td>Configures meshpoint monitoring interval</td>
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<td>min-misconfiguration-recovery-time</td>
<td>Configures the minimum device connectivity verification time</td>
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</tr>
<tr>
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<td>Configures MiNT protocol settings</td>
<td>page 7-396</td>
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<tr>
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<td>Verifies device connectivity after a configuration is received</td>
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<tr>
<td>mpact-server</td>
<td>Configures an MPact server with this device</td>
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</tr>
<tr>
<td>neighbor-inactivity-timeout</td>
<td>Configures neighbor inactivity timeout value</td>
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<td>Command</td>
<td>Description</td>
<td>Reference</td>
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</tr>
<tr>
<td>neighbor-info-interval</td>
<td>Configures the neighbor information exchange interval</td>
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<tr>
<td>no</td>
<td>Negates a command or resets values to their default settings</td>
<td>page 7-480</td>
</tr>
<tr>
<td>noc</td>
<td>Configures NOC settings</td>
<td>page 7-408</td>
</tr>
<tr>
<td>nsight</td>
<td>Configures NSight database statistics related parameters. Use this command to set the interval at which data is updated by the RF Domain managers to the NSight server. This command is applicable only on the NX95XX series and NX9600 service platforms and is configured on the NSight server.</td>
<td>page 7-481</td>
</tr>
<tr>
<td>ntp</td>
<td>Configures NTP server settings</td>
<td>page 7-414</td>
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<tr>
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<td>Sets the duration, in minutes, for which a device remains unadopted before it generates offline event</td>
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<tr>
<td>override-wlan</td>
<td>Configures WLAN RF Domain level overrides on the logged device</td>
<td>page 7-485</td>
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<tr>
<td>power-config</td>
<td>Configures power mode features</td>
<td>page 7-418</td>
</tr>
<tr>
<td>preferred-controller-group</td>
<td>Specifies the wireless controller or service platform group the system prefers for adoption</td>
<td>page 7-420</td>
</tr>
<tr>
<td>preferred-tunnel-controller</td>
<td>Configures the tunnel wireless controller or service platform preferred by the system for tunneling extended VLAN traffic</td>
<td>page 7-421</td>
</tr>
<tr>
<td>radius</td>
<td>Configures device-level RADIUS authentication parameters</td>
<td>page 7-422</td>
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<td>Enables the RF Domain manager</td>
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<td>Configures dynamic router protocol settings</td>
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<tr>
<td>rsa-key</td>
<td>Assigns a RSA key to SSH</td>
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<tr>
<td>sensor-server</td>
<td>Configures an AirDefense sensor server</td>
<td>page 7-490</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Enables spanning tree commands on the logged device</td>
<td>page 7-426</td>
</tr>
<tr>
<td>traffic-class-mapping</td>
<td>Maps the IPv6 traffic class value of incoming IPv6 untagged packets to 802.1p priority</td>
<td>page 7-429</td>
</tr>
<tr>
<td>traffic-shape</td>
<td>Enables traffic shaping and configures traffic shaping parameters on this device</td>
<td>page 7-431</td>
</tr>
<tr>
<td>trustpoint (device-config-mode)</td>
<td>Assigns trustpoints to validate various services, such as HTTPS, RADIUS CA, RADIUS server, external LDAP server, etc.</td>
<td>page 7-492</td>
</tr>
<tr>
<td>timezone</td>
<td>Configures wireless controller or service platform’s time zone settings</td>
<td>page 7-491</td>
</tr>
<tr>
<td>tunnel-controller</td>
<td>Configures the tunneled WLAN (extended VLAN) wireless controller or service platform’s name</td>
<td>page 7-438</td>
</tr>
<tr>
<td>use</td>
<td>Associates different policies and settings with this device</td>
<td>page 7-439</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>vrrp</td>
<td>Configures VRRP group settings</td>
<td>page 7-445</td>
</tr>
<tr>
<td>vrrp-state-check</td>
<td>Publishes interface via OSPF or BGP based on Virtual Router Redundancy Protocol (VRRP) status</td>
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</tr>
<tr>
<td>wep-shared-key-auth</td>
<td>Enables support for 802.11 WEP shared key authentication</td>
<td>page 7-450</td>
</tr>
<tr>
<td>mirror</td>
<td>Enables port mirroring on GE ports. This command is supported only on the NX4524 and NX6524 series service platforms.</td>
<td>page 7-494</td>
</tr>
<tr>
<td>raid</td>
<td>Enables alarm on the array. This command is supported only on the NX9500 series service platform.</td>
<td>page 7-496</td>
</tr>
<tr>
<td>slot</td>
<td>Assigns a physical slot for running Team-URC VM on this profile/device. This feature is support only on the NX45XX and NX65XX series service platforms.</td>
<td>page 7-457</td>
</tr>
</tbody>
</table>
7.2.1 adoption-site

Device Config Commands

Sets the device’s adoption site name

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

adoption-site <SITE-NAME>

Parameters

- adoption-site <SITE-NAME>

| adoption-site <SITE-NAME> | Sets the device’s adoption site name |

Examples

rfs4000-229D58(config-device-00-23-68-22-9D-58)#adoption-site SanJoseMainOffice

Related Commands

- no | Disables or reverts settings to their default |
7.2.2 area

Device Config Commands

Sets the physical area where the device (controller, service platform, or access point) is deployed. This can be a building, region, campus or other area that describes the deployment location of the device. Assigning an area name is helpful when grouping devices in RF Domains and profiles, as devices in the same physical deployment location may need to share specific configuration parameters in respect to radio transmission and interference requirements specific to that location.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

text

Parameters

- area <AREA-NAME>

Examples

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#area RMZEcoSpace

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context

ap71xx 00-04-96-4A-A7-08
use profile default-ap71xx
use rf-domain default
hostname ap7131-4AA708
area RMZEcospace
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#

Related Commands

- **no** — Disables or reverts settings to their default
7.2.3 channel-list

Device Config Commands

Configures the channel list advertised to wireless clients

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ESS6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

channel-list [2.4GHz|5GHz|dynamic]
channel-list [2.4GHz <CHANNEL-LIST>|5GHz <CHANNEL-LIST>|dynamic]

Parameters

- channel-list [2.4GHz <CHANNEL-LIST>|5GHz <CHANNEL-LIST>|dynamic]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-list</td>
<td>Configures the channel list advertised to wireless clients</td>
</tr>
<tr>
<td>2.4GHz &lt;CHANNEL-LIST&gt;</td>
<td>Configures the channel list advertised by radios operating in 2.4 GHz</td>
</tr>
<tr>
<td>5GHz &lt;CHANNEL-LIST&gt;</td>
<td>Configures the channel list advertised by radios operating in 5.0 GHz</td>
</tr>
<tr>
<td>dynamic</td>
<td>Enables dynamic (neighboring access point based) update of configured channel list</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#channel-list 2.4GHz 1,2
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
ap71xx 00-04-96-4A-A7-08
  use profile default-ap71xx
  use rf-domain default
  hostname ap7131-4AA708
  area RMZEcospace
channel-list 2.4GHz 1,2
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets the channel list configuration</td>
</tr>
</tbody>
</table>
7.2.4 contact

Device Config Commands

Defines an administrative contact for a deployed device (controller, service platform, or access point)

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

contact <WORD>

Parameters

- contact <WORD>

Examples

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#contact Bob+1-631-738-5200

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
  ap71xx 00-04-96-4A-A7-08
    use profile default-ap71xx
    use rf-domain default
    hostname ap7131-4AA708
    area RMZEcospace
    contact Bob+1-631-738-5200
    channel-list 2.4GHz 1,2
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#

Related Commands

no

Resets the administrative contact name
7.2.5 country-code

Device Config Commands

Defines the two digit country code for legal device deployment

Configuring the correct country is central to legal operation. Each country has its own regulatory restrictions concerning electromagnetic emissions and the maximum RF signal strength that can be transmitted.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

country-code <WORD>

Parameters

- country-code <COUNTRY-CODE>

<table>
<thead>
<tr>
<th>country-code &lt;COUNTRY-CODE&gt;</th>
<th>Defines the two digit country code for legal device deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;COUNTRY-CODE&gt; – Specify the two letter ISO-3166 country code.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#country-code us

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
ap71xx 00-04-96-4A-A7-08
  use profile default-ap71xx
  use rf-domain default
  hostname ap7131-4AA708
  area RMZEcospace
  contact Bob+1-631-738-5200
  country-code us
  channel-list 2.4GHz 1,2
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#

Related Commands

- no
  Removes the configured country code
7.2.6 floor

Device Config Commands

Sets the building floor name representative of the location within the area or building the device (controller, service platform, or access point) is physically deployed. Assigning a building floor name is helpful when grouping devices in RF Domains and profiles, as devices on the same physical building floor may need to share specific configuration parameters in respect to radio transmission and interference requirements specific to that location.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

floor <FLOOR-NAME> <1-4094>

Parameters

- floor <FLOOR-NAME> <1-4094>

Examples

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#floor 5thfloor

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
ap71xx 00-04-96-4A-A7-08
use profile default-ap71xx
use rf-domain default
hostname ap7131-4AA708
area RMZEcospace
floor 5thfloor
contact Bob+1-631-738-5200
country-code us
channel-list 2.4GHz 1,2
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#

Related Commands

no | Removes device’s location floor name
7.2.7 **geo-coordinates**

*Device Config Commands*

Configures the geographic coordinates for this device. Specifies the exact location of this device in terms of latitude and longitude coordinates.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
geographic coordinates <-90.0000-90.0000> <-180.0000-180.0000>
```

**Parameters**

- **geographic coordinates <-90.0000-90.0000> <-180.0000-180.0000>**

<table>
<thead>
<tr>
<th>geographic coordinates</th>
<th>Configures the geographic coordinates for this device</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;-90.0000-90.0000&gt; – Specify the device’s latitude coordinate from -90.0000 to 90.0000. When looking at a floor map, latitude lines specify the <em>east-west</em> position of a point on the Earth’s surface.</td>
</tr>
<tr>
<td></td>
<td>• &lt;-180.0000-180.0000&gt; – Specify the device’s longitude coordinate from -180.0000 to 180.0000. When looking at a floor map, longitude lines specify the <em>north-south</em> position of a point on the Earth’s surface.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-device-00-23-68-22-9D-58)#geo-coordinates -90.0000 166.0000
```

```
rfs4000-229D58(config-device-00-23-68-22-9D-58)#show context
rfs4000 00-23-68-22-9D-58
use profile default-rfs4000
use rf-domain default
hostname rfs4000-229D58
geo-coordinates -90.0000 166.0000
license AP DEFAULT-6AP-LICENSE
license ADSEC DEFAULT-ADV-SEC-LICENSE
ip default-gateway 192.168.13.2
ip default-gateway priority static-route 20
interface ge1
  switchport mode access
  switchport access vlan 1
interface vlan1
  ip address 192.168.13.9/24
  ip address 192.168.0.1/24 secondary
  ip dhcp client request options all
use client-identity-group ClientIdentityGroup
logging on
logging console warnings
logging buffered warnings
rfs4000-229D58(config-device-00-23-68-22-9D-58)#
```

**Related Commands**

```
no
```

| no | Removes device’s geographic coordinates |
## 7.2.8 hostname

### Device Config Commands

Sets the system’s network name

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

```
hostname <WORD>
```

### Parameters

- `hostname <WORD>`

### Examples

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#hostname TechPubAP7131
```

The hostname has changed from ‘ap7131-4AA708’ to ‘TechPubAP7131’

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
```

```
ap71xx 00-04-96-4A-A7-08
  use profile default-ap71xx
  use rf-domain default
  hostname TechPubAP7131
  area RMZEcospace
  floor 5thfloor
  contact Bob+1-631-738-5200
  country-code us
  channel-list 2.4GHz 1,2
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#
```

### Related Commands

- `no`
  - Removes device’s hostname
7.2.9 layout-coordinates

Device Config Commands

Configures X and Y layout coordinates for the device

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
layout-coordinates <-4096.0-4096.0> <-4096.0-4096.0>
```

Parameters

- `layout-coordinates <-4096.0-4096.0> <-4096.0-4096.0>`

<table>
<thead>
<tr>
<th>layout-coordinates</th>
<th>Configures X and Y layout coordinates for the device</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;-4096.0-4096.0&gt;</td>
<td>Specify the X coordinate from -4096 - 4096.0</td>
</tr>
<tr>
<td>&lt;-4096.0-4096.0&gt;</td>
<td>Specify the Y coordinate from -4096 - 4096.0</td>
</tr>
</tbody>
</table>

Examples

```bash
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#layout-coordinates 1.0 2.0
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
ap71xx 00-04-96-4A-A7-08
  use profile default-ap71xx
  use rf-domain default
  hostname TechPubAP7131
  area RMZEcospace
  floor 5thfloor
  layout-coordinates 1.0 2.0
  contact Bob+1-631-738-5200
  country-code us
  channel-list 2.4GHz 1,2
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#
```

Related Commands

- `no` Removes device’s layout co-ordinates
7.2.10 license

Device Config Commands

Adds a license pack on the device for the specified feature (AP/AAP/ADSEC/HTANLT/SMART-CACHE/WEBF).

The WiNG HM network defines a three-tier structure, consisting of multiple wireless sites managed by a single Network Operations Center (NOC) controller. The NOC controller constitutes the first and the site controllers constitute the second tier of the hierarchy. The site controllers may or may not be grouped to form clusters. The site controllers in turn adopt and manage access points that form the third tier of the hierarchy.

The NOC controllers and/or site controllers can both have license packs installed. Adoption of APs by the NOC and site controllers depends on the number of licenses available on each of these controllers.

The NOC controllers and/or site controllers can both have license packs installed. When a AP is adopted by a site controller, the site controller pushes a license on to the AP. The various possible scenarios are:

- AP licenses installed only on NOC controller:
  The NOC controller provides the site controllers with AP licenses, ensuring that per platform limits are not exceeded.

- AP licenses installed on site controller:
  The site controller uses its installed licenses, and then asks the NOC controller for additional licenses in case of a shortage.

  In a hierarchical and centrally managed network, the NOC controller can pull unused AP licenses from site controllers and relocate to other site controllers when required.

- AP licenses installed on any member of a site cluster:
  The site controller shares installed and borrowed (from the NOC) licenses with other controllers within a site cluster.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

license <WORD> <LICENSE-KEY>

Parameters

- license <WORD> <LICENSE-KEY>

| <WORD> | Specify the feature name (AP/AAP/ADSEC/HTANLT/SMART-CACHE/WEBF/NSIGHT) for which license is added
| Note: NSight is supported only on NX9500, NX9510, and NX9600 model service platforms. |
| <LICENSE-KEY> | Specify the license key |
Examples

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#license ap aplicensekey@123

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
ap71xx 00-04-96-4A-A7-08
  use profile default-ap71xx
  use rf-domain default
  hostname TechPubAP7131
  floor 5thfloor
  layout-coordinates 1.0 2.0
  license AP aplicensekey@1234 aplicensekey@123
  location SanJose
  no contact
  country-code us
  channel-list 2.4GHz 1,2
  mac-name 00-04-96-4A-A7-08 5.8TestAP
  neighbor-info-interval 50

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#

nx6524-858126(config-device-5C-0E-8B-85-81-26)#license ?
  WORD  Feature name (AP/AAP/ADSEC/HTANLT/SMART-CACHE/WEBF) for which
  license is to be added

nx6524-858126(config-device-5C-0E-8B-85-81-26)#license SMART-CACHE
29bedfa30cf4a5bcd20cd8815e00c948d62f26814e8346ef6f9e884832a7a49b349e6938f63ef653

nx6524-858126(config-device-5C-0E-8B-85-81-26)#commit

nx6524-858126(config-device-5C-0E-8B-85-81-26)#show licenses
Serial Number : 1118520500065
Device Licenses:
  AP-LICENSE
    String : 29bedfa30cf4a5bc0c732a20e39f728df26814e8346ef6739f3ee2b1691d10246de8a1e439131
  ...  
  HOTSPOT-ANALYTICS
    String : 29bedfa30cf4a5bcd83ad26e814f39dddf26814e8346ef6f429383a6d5lac549e6938f63ef653
  SMART-CACHE
    String : 29bedfa30cf4a5bcd20cd8815e00c948d62f26814e8346ef6f9e884832a7a49b349e6938f63ef653
--More--
nx6524-858126(config-device-5C-0E-8B-85-81-26)#
7.2.11 location

*Device Config Commands*

Sets the location where a managed device (controller, service platform, or access point) is deployed. This is the location of the device with respect to the RF Domain it belongs.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

location <WORD>

**Parameters**

- location <WORD>

**Examples**

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#location SanJose

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context ap71xx 00-04-96-4A-A7-08
  use profile default-ap71xx
  use rf-domain default
  hostname TechPubAP7131
  area RMZEcospace
  floor 5thfloor
  layout-coordinates 1.0 2.0
  location SanJose
  contact Bob+1-631-738-5200
  country-code us
  channel-list 2.4GHz 1,2
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#

**Related Commands**

no

Removes a managed device’s location
### 7.2.12 mac-name

#### Device Config Commands

Configures a client name to MAC address mapping. Use this command to assign a user-friendly name to the device (controller, service platform, or access point) and map it to the device’s MAC address.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
mac-name <MAC> <NAME>
```

#### Parameters

- `mac-name <MAC> <NAME>`

<table>
<thead>
<tr>
<th>mac-name &lt;MAC&gt; &lt;NAME&gt;</th>
<th>Maps a user-friendly name to the device’s MAC address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;MAC&gt;</code> – Specify the device’s MAC address.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;NAME&gt;</code> – Specify the ‘friendly’ name used for the specified MAC address. This is the name used in events and statistics logs.</td>
</tr>
</tbody>
</table>

#### Examples

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#mac-name 00-04-96-4A-A7-08 5.8TestAP
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
ap71xx 00-04-96-4A-A7-08
use profile default-ap71xx
use rf-domain default
hostname TechPubAP7131
area RMZEcospa
floor 5thfloor
layout-coordinates 1.0 2.0
location SanJose
contact Bob+1-631-738-5200
country-code us
channel-list 2.4GHz 1,2
mac-name 00-04-96-4A-A7-08 5.8TestAP
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#
```

#### Related Commands

```
no
```

Removes the device’s friendly name to MAC address mapping
7.2.13 **mpact-server**

*Device Config Commands*

Configures an MPact server with this device

Supported in the following platforms:

- Service Platforms — NX9000, NX9500, NX9510, NX9600

**Syntax**

```
mpact-server <1-3> ip <IP/HOST-NAME> {port [443|<1-65535>]}
```

**Parameters**

- `mpact-server <1-3> ip <IP/HOST-NAME> {port [443|<1-65535>]}`

**Examples**

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#mpact-server 1 ip 192.168.13.32 port 221
```

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#show context
use profile default-nx9000
use rf-domain default
hostname nx9500-6C8809
license AAP
66069c24b3bb1259b34ff016c723a9e299dd408f0ff891e7c5f7e279a382648397d6b3e975e356a1
license HTANLT
66069c24b3bb1259eb36826cab3cc83999dd408f0ff891e74b62b2d3594f0b3d7e7967f30e49e497
mpact-server 1 ip 192.168.13.32 port 221
use nsight-policy nsight-noc
ip default-gateway 192.168.13.2
no device-upgrade auto
interface vlan1
  ip address 192.168.13.13/24
logging on
logging console debugging
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#
```

**Related Commands**

| **no** | Removes the MPact servers associated with this device |
7.2.14 no

Negates a command or resets values to their default

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [adopter-auto-provisioning-policy-lookup|adoption-site|alias|application-policy|area|arp|auto-learn-staging-config|autoinstall|bridge|captive-portal|cdp|channel-list|cluster|configuration-persistence|contact|controller|country-code|critical-resource|crypto|database-backup|device-upgrade|dot1x|dpi|dscp-mapping|email-notification|environmental-sensor|events|export|file-sync|floor|geo-coordinates|gre|hostname|http-analyze|interface|ip|ipv6|l2tpv3|l3-lite-table|layout-coordinates|led|led-timeout|legacy-auto-downgrade|legacy-auto-update|license|lldp|load-balancing|location|logging|mac-address-table|mac-auth|mac-name|management-server|memory-profile|meshpoint-device|meshpoint-monitor-interval|min-misconfiguration-recovery-time|min|mirror|minconfiguration-recovery-time|mpact-server|noc|nsight-server|ntp|offline-duration|override-wlan|power-config|preferred-controller-group|preferred-tunnel-controller|radius|raid|rf-domain-manager|router|rsa-key|sensor-server|slot|spanning-tree|timezone|traffic-class-mapping|traffic-shape|trustpoint|tunnel-controller|use|vrrp|vrrp-state-check|wep-shared-key-auth|service]

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes or resets the logged device’s settings based on the parameters passed |

Usage Guidelines

The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated

Examples

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#no area

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#no contact
7.2.15 nsight

Device Config Commands

Configures NSight database related parameters. Use this command to configure the data-update periodicity, number of applications posted to the NSight server for a wireless client, and the duration for which data is stored in the NSight database’s buckets. These parameters impact the amount of data stored in the NSight DB and interval at which data is aggregated and expired within the NSight DB. For more information on data aggregation and expiration, see (Data Aggregation and Expiration).

Configure these parameters in the NSight server’s device configuration mode.

Supported in the following platforms:
• Service Platforms — NX9000, NX9500, NX9510, NX9600, VX9000

Syntax

nsight database [statistics|summary]


nsight database statistics [avc-update-interval|update-interval|wireless-clients-update-interval] [120|30|300|60|600]

nsight database statistics max-apps-per-client <1-1000>

nsight database summary duration <1-24> <1-168> <1-2160> <24-26280>

Parameters

• nsight database statistics [avc-update-interval|max-apps-per-client|update-interval|wireless-clients-update-interval] [120|30|300|60|600]

<table>
<thead>
<tr>
<th>nsight database statistics</th>
<th>Configures NSight database statistics related parameters</th>
</tr>
</thead>
</table>
| avc-update-interval         | Configures the interval, in seconds, at which Application Visibility and Control (AVC) statistics is updated to the NSight database. This interval represents the rate at which AVC-related data is inserted in the NSight database’s first bucket. This first bucket data is referred to as the RAW records. A bucket is a database collection that holds statistical data on a per RF Domain basis. For more information, see (Data Aggregation and Expiration).

When configured, RF Domain managers posting AVC-related data to the NSight server receive a reply from the NSight server intimating the next update time. The NSight server calculates the ‘next update time’ based on the avc-update-interval configured here. |

| update-interval | Configures the interval, in seconds, at which data is updated to the NSight server. This interval represents the rate at which data (excluding AVC and wireless-clients related statistics) is inserted in the NSight database’s first bucket. This first bucket data is referred to as the RAW records. A bucket is a database collection that holds statistical data on a per RF Domain basis. For more information, see (Data Aggregation and Expiration).

When configured, RF Domain managers posting data to the NSight server receive a reply from the NSight server intimating the next update time. The NSight server calculates the ‘next update time’ based on the update-interval configured here. |

Note: Use the ‘avc-update-interval’ and ‘wireless-clients-update-interval’ keywords to configure update interval for AVC-related and wireless-clients related information respectively. |
### wireless-clients-update-interval

Configures the interval, in seconds, at which wireless-client statistics is updated to the NSight server. This interval represents the rate at which wireless-clients related statistics is inserted in the NSight database’s first bucket. This first bucket data is referred to as the RAW records. A bucket is a database collection that holds statistical data on a per RF Domain basis. For more information, see *(Data Aggregation and Expiration)*.

When configured, RF Domain managers posting wireless-client related data to the NSight server receive a reply from the NSight server intimating the next update time. The NSight server calculates the ‘next update time’ based on the `wireless-clients-update-interval` configured here.

| [120|30|300|60|600] | The following keywords are common to all of the above parameters:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>120 – Sets the data-update periodicity as 120 seconds (2 minutes)</td>
<td></td>
</tr>
<tr>
<td>30 – Sets the data-update periodicity as 30 seconds</td>
<td></td>
</tr>
<tr>
<td>300 – Sets the data-update periodicity as 300 seconds (5 minutes). This is the default setting for the ‘avc-update-interval’ and ‘wireless-clients-update-interval’ parameters.</td>
<td></td>
</tr>
<tr>
<td>60 – Sets the data-update periodicity as 60 seconds (1 minute). This is the default setting for the ‘update-interval’ parameter.</td>
<td></td>
</tr>
<tr>
<td>600 – Sets the data-update periodicity as 600 seconds (10 minutes)</td>
<td></td>
</tr>
</tbody>
</table>

### nsight database statistics max-apps-per-client <1-1000>

Configures NSight database statistics related parameters

**max-apps-per-client**

Configures the maximum number of applications per wireless-client to be posted to the NSight server within the configured data-update interval. This information is included in the AVC statistics posted by RF Domain managers to the NSight server.

**<1-1000>**

Specify the number of applications posted from 1 - 1000. The default is 10 applications per wireless client.

### nsight database summary duration <1-24> <1-168> <1-2160> <24-26280>

Configures the NSight database’s per-bucket data storage duration

**duration <1-24> <1-168> <1-2160> <24-26280>**

Configures the duration for which data is stored on a per-bucket basis

- **<1-24>** – Specify the bucket 1 duration from 1 - 24 hours (i.e. 1 hour to 1 day). The default is 8 hours.
- **<1-168>** – Specify the bucket 2 duration from 1 - 168 hours (i.e. 1 hour to 7 days). The default is 24 hours.
- **<1-2160>** – Specify the bucket 3 duration from 1 - 2160 hours (i.e. 1 hour to 90 days). The default is 7 days (168 hours).
- **<24-26280>** – Specify the bucket 4 duration from 24 - 26280 hours (i.e. 1 day to 3 years). The default is 365 days (1 year).

A bucket is a database collection that holds statistical data for each RF Domain within the network. (Note, only those RF Domain’s that are using an NSight policy with the NSight server host configured will post data to the NSight server. For more information, see *use* in the RF Domain configuration mode.) Zebra NSight database has four (4) buckets. The data from each bucket is aggregated and pushed to the next bucket once the data storage duration, specified for the bucket, has exceeded. For more information on data aggregation, see *(Data Aggregation and Expiration)*.
Usage Guidelines (Data Aggregation and Expiration)

Data Aggregation:
Zebra’s NSight functionality, a data analytics tool, analyzes data that is generated periodically by the nodes within the managed wireless LAN. For large WLAN networks, generating significantly large amount of data, storing data forever is neither feasible nor beneficial. Therefore, older statistics are summarized into aggregated (averaged) records. All records, for a fixed time period in past, are summarized into one record by taking an average of them. Although this causes a loss in the data’s granularity, average numbers for any given time period is still available.

Statistical data periodically posted by RF Domain managers to the NSight server are stored in buckets (database collections) within the NSight database. There are four buckets in total. These are:

- First bucket (termed as the RAW bucket) - B1
- Second bucket - B2
- Third bucket - B3
- Fourth bucket - B4

On completion of the data storage duration, records from a bucket are aggregated (at a fixed rate) and inserted into the next bucket. The rate at which records are aggregated into the next bucket becomes the next bucket’s granularity. For example, the B1 records (that have exceeded the data storage duration configured for B1) are aggregated (at the rate specified) and inserted into B2. Similarly, data from B2 are aggregated into B3, and from B3 to B4. The fixed rate of aggregation (or granularity) AND default storage duration for each bucket is as follows:

- B1: storage duration 8 hours
- B2: granularity 10 minutes / storage duration 24 hours
- B3: granularity 1 hour / storage duration 7 days
- B4: granularity 1 day / storage duration 1 year

Let us consider (with default update-interval settings) the growth of any one of the statistical buckets.

- Since B1’s default data storage duration is 8 hours, B1 will hold a maximum of 960 records per RF Domain after 8 hours (updated at the rate of 30 seconds).
- Since B2’s granularity is 10 minutes, every 10 minutes 20 records from the B1 will be aggregated into a single record and inserted into B2.
- Since B2’s default storage duration is 24 hours, it will contain a maximum of 144 records per RF Domain after 24 hours.
- Since B3’s granularity is 1 hour, every hour 6 records from B2 will be aggregated into a single record and inserted into B3.
- Since B3’s default storage duration is 7 days, it will contain a maximum of 168 records per RF Domain after 7 days.
- Since B4’s granularity is 1 day, every day 24 records from B3 will be aggregated into a single record and inserted into B4.
- Since B4’s default storage duration is 365 days, it will contain a maximum of 365 records per RF Domain after 1 year.

Data Expiration:
The expiration of older records (also referred to as purging or deleting of records) occurs along with data aggregation for each bucket.

Let us consider (with default data storage-duration settings) the expiration of data for any one of the statistical buckets.

- As stated earlier, at the end of 8 hours B1 will have 960 records per RF Domain. After a period of 8 hours and 10 minutes, all 960 records are aggregated into 144 records and inserted into B2. To enable B1 to hold exactly 8 hours worth of data, 20 of the oldest records (corresponding to the first 10 minutes) are purged from B1 at the end of 8 hours and 10 minutes. This expiration cycle is triggered every 10 minutes.
• At the end of 24 hours B2 will have 144 records per RF Domain. After a period of 24 hours and 10 minutes, one of the oldest record (corresponding to the first 10 minutes) is purged from B2. This expiration cycle is triggered every 10 minutes to enable B2 to maintain exactly 24 hours worth of data.

• At the end of 7 days B3 will have 168 records per RF Domain. After a period of 7 days and one hour one of the oldest record (corresponding to the first hour) is purged from B3. This expiration cycle is triggered every 1 hour to enable B3 to maintain exactly 7 days worth of data.

• At the end of 365 days B4 will have 365 records per RF Domain. After 365 days, the oldest records (corresponding to the first day) are purged from B4. This expiration cycle is triggered every 1 day to enable B4 to maintain exactly 365 days worth of data.

Examples

```bash
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#nsight database statistics avc-update-interval 120
```

```bash
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#nsight database statistics update-interval 30
```

```bash
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#nsight database statistics wireless-clients-update-interval 600
```

```bash
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#nsight database statistics max-apps-per-client 20
```

```bash
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#nsight database summary duration 12 30 200 500
```

```bash
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#show context include-factory | include nsight
```

```bash
use nsight-policy nsight-noc
```

```bash
nsight database statistics update-interval 30
```

```bash
nsight database statistics wireless-clients-update-interval 600
```

```bash
nsight database summary duration 12 30 200 500
```

```bash
nsight database statistics avc-update-interval 120
```

```bash
nsight database statistics max-apps-per-mu 20
```

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Reverts the NSight database related parameters configured to default values</td>
</tr>
</tbody>
</table>
7.2.16 override-wlan

*Device Config Commands*

Configures WLAN’s RF Domain level overrides

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

override-wlan <WLAN> [shutdown|ssid|vlan-pool|wep128|wpa-wpa2-psk]
override-wlan <WLAN> [shutdown|ssid <SSID>|vlan-pool <1-4094> {limit <0-8192>}] 
   | wpa-wpa2-psk <WORD>]
override-wlan <WLAN> wep128 [key <1-4> hex [0<WORD>|2 <WORD>] | transmit-key <1-4>]

**Parameters**

- override-wlan <WLAN> [shutdown|ssid <SSID>|vlan-pool <1-4094> {limit <0-8192>}] 
  | wpa-wpa2-psk <WORD>]

| <WLAN> | Specify the WLAN name. Configure the following WLAN parameters: SSID, VLAN pool, and WPA-WPA2 key. |
| shutdown | Shuts down the WLAN’s (identified by the <WLAN> keyword) operations on all mapped radios |
| SSID <SSID> | Configures the WLAN’s Service Set Identifier (SSID)
  | • <SSID> – Specify an SSID ID. |
| vlan-pool <1-4094> {limit <0-8192>} | Configures a pool of VLANs for the selected WLAN
  | • <1-4094> – Specifies a VLAN pool ID from 1 - 4094.
  | • limit – Optional. Limits the number of users on this VLAN pool
  | • <0-8192> – Specify the user limit from 0 - 8192.
  | **Note**: The VLAN pool configuration overrides the VLAN configuration. |
| wpa-wpa2-psk <WORD> | Configures the WLAN WPA-WPA2 key or passphrase for the selected WLAN
  | • <WORD> – Specify a WPA-WPA2 key or passphrase. |

- override-wlan <WLAN> wep128 [key <1-4> hex [0<WORD>|2 <WORD>] | transmit-key <1-4>]

| <WLAN> | Specify the WLAN name. |
| wep128 [key <1-4> hex [0<WORD>|2 <WORD>] | Configures the WEP128 key for this WLAN, and also enables key transmission
  | Wired Equivalent Privacy (WEP) is a security protocol specified in the IEEE Wireless Fidelity (Wi-Fi) standard. WEP 128 uses a 104 bit key, which is concatenated with a 24-bit initialization vector (IV) to form the RC4 traffic key. This results in a level of security and privacy comparable to that of a wired LAN.
  | • key <1-4> hex – Configures a hexadecimal key (clear text or encrypted) and specifies the key’s index.
  | • 0 <WORD> – Configures a clear text key. Specify a 4 - 32 character pass key.
  | • 2 <WORD> – Configures an encrypted key. Specify a 4 - 32 character pass key.
  | • transmit-key <1-4> – Enables transmission of key index. Specify the key index.
  | **Note**: Wireless devices and their connected clients use the algorithm to convert an ASCII string to the same hexadecimal number. Clients without the required adapters need to use WEP keys manually configured as hexadecimal numbers. |
Examples

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#override-wlan test vlan-pool 8

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
ap71xx 00-04-96-4A-A7-08
use profile default-ap71xx
use rf-domain default
hostname TechPubAP7131
floor 5thfloor
layout-coordinates 1.0 2.0
license AP aplicenseley@1234 aplicensekey@123
location SanJose
no contact
country-code us
channel-list 2.4GHz 1,2
override-wlan test vlan-pool 8
mac-name 00-04-96-4A-A7-08 5.8TestAP
neighbor-info-interval 50
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes RF Domain level WLAN overrides</td>
</tr>
</tbody>
</table>
7.2.17 remove-override

Device Config Commands

Removes device overrides in order to enable profile settings to take effect

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

remove-override <PARAMETERS>

Parameters

- remove-override <PARAMETERS>

| remove-override <PARAMETERS> | Removes settings configured at the device level based on the parameters passed. The profile (applied to the device) settings take effect once the device-level overrides are removed. |

Examples

```
rfs4000-229D58(config-device-00-23-68-22-9D-58)#remove-override ?
adopter-auto-provisioning-policy-lookup Use centralized auto-provisioning policy when adopted by another controller
adoption Adoption configuration
adoption-mode Configure the adoption mode for the access-points in this RF-Domain
alias Alias
all Remove all overrides for the device
application-policy Application Policy configuration
area Reset name of area where the system is located
arp Address Resolution Protocol (ARP)
auto-learn Auto learning
autogen-uniqueid Autogenerate a unique id
autostall Autostall settings
bridge Bridge group commands
captive-portal Captive portal
cdp Cisco Discovery Protocol
channel-list Configure a channel list to be advertised to wireless clients
cluster Cluster configuration
collection-persistence Automatic write of startup configuration file
contact The contact
ccontroller WLAN controller configuration
country-code The country of operation
critical-resource Critical Resource
crypto Encryption related commands
device-upgrade Device firmware upgrade
dot1x 802.1X
dpi Deep-Packet-Inspection (Application Assurance)
dscp-mapping IP DSCP to 802.1p priority mapping for untagged frames
devices before interoperating
email-notification Email notification configuration
enforce-version Check the firmware versions of devices before interoperating
environmental-sensor Environmental Sensors Configuration
events System event messages
export Export a file
```
file-sync
firewall
floor
global
geo-coordinates
gre
interface
ipv6
l2tpv3
l3e-lite-table
led
lldp
location
logging
mac-address-table
mac-auth
memory-profile
mint
mpact-server
noc
ntp
offline-duration
override-wlan
power-config
preferred-controller-group
preferred-tunnel-controller
rf-domain-manager
router
routing-policy
sensor-server
spanning-tree
timezone
traffic-class-mapping
traffic-shape
trustpoint
tunnel-controller
use
vrrp
service

default
7-488 WiNG 5.8.4 CLI Reference Guide
### 7.2.18 rsa-key

#### Device Config Commands

Assigns an SSH RSA key

SSH keys are a pair of cryptographic keys used to authenticate users instead of, or in addition to, a username/password. One key is private and the other is public key. Secure Shell (SSH) public key authentication can be used by a requesting client to access resources, if properly configured. The RSA key pair must be generated on the client. The public portion of the key pair resides with the controller, service platform, or access point locally, while the private portion remains on a secure area of the client.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```bash
era-key ssh <RSA-KEY-NAME>
```

#### Parameters

- `rsa-key ssh <RSA-KEY-NAME>`

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;RSA-KEY-NAME&gt;</code></td>
<td>Assigns RSA key to SSH</td>
</tr>
<tr>
<td><code>&lt;RSA-KEY-NAME&gt;</code></td>
<td>Specifies the RSA key name. The key should be installed using PKI commands in the enable mode.</td>
</tr>
</tbody>
</table>

#### Examples

```bash
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#rsa-key ssh rsa-key1

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
ap71xx 00-04-96-4A-A7-08
use profile default-ap71xx
use rf-domain default
hostname TechPubAP7131
floor 5thfloor
layout-coordinates 1.0 2.0
license AP aplicenseley@1234 aplicensekey@123
rsa-key ssh rsa-key1
location SanJose
no contact
country-code us
channel-list 2.4GHz 1,2
override-wlan test vlan-pool 8
mac-name 00-04-96-4A-A7-08 5.8TestAP
neighbor-info-interval 50
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#
```

#### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes RSA key from service</td>
</tr>
</tbody>
</table>
## 7.2.19 `sensor-server`

*Device Config Commands*

Configures an AirDefense sensor server resource for client terminations and WIPS event logging. This is the server that supports WIPS events on behalf of the controller or service platform.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

```
sensor-server <1-3> ip <IP/HOSTNAME> {port [443|<1-65535>]
```

### Parameters

- `sensor-server <1-3> ip <IP/HOSTNAME>`
- `port [443|<1-65535>]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>sensor-server &lt;1-3&gt;</code></td>
<td>Sets a numerical index to differentiate this AirDefense sensor server from other servers. A maximum of 3 (three) sensor server resources can be defined.</td>
</tr>
<tr>
<td><code>ip &lt;IP/HOSTNAME&gt;</code></td>
<td>Configures the AirDefense sensor server’s IP address or hostname.</td>
</tr>
<tr>
<td>`port [443</td>
<td>&lt;1-65535&gt;]`</td>
</tr>
<tr>
<td>• <code>443</code></td>
<td>The default port used by the AirDefense server. This is the default setting.</td>
</tr>
<tr>
<td>• <code>&lt;1-65535&gt;</code></td>
<td>Manually sets the port number of the AirDefense server from 1 - 65535</td>
</tr>
</tbody>
</table>

### Examples

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#sensor-server 1 ip 172.16.10.7
```

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#sensor-server 1 ip 172.16.10.7
```

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#sensor-server 1 ip 172.16.10.7
```

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#sensor-server 1 ip 172.16.10.7
```

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#sensor-server 1 ip 172.16.10.7
```

### Related Commands

- `no` | Removes configured sensor server settings |
### 7.2.20 timezone

*Device Config Commands*

Configures device’s timezone

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`timezone <TIMEZONE>`

**Parameters**

- `timezone <TIMEZONE>`

**Examples**

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#timezone Etc/UTC
```

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#show context
    ap71xx 00-04-96-4A-A7-08
        use profile default-ap71xx
        use rf-domain default
        hostname TechPubAP7131
        floor 5thfloor
        layout-coordinates 1.0 2.0
        license AP aplicenseley@1234 aplicensekey@123
        rsa-key ssh rsa-key1
        location SanJose
        no contact
    timezone Etc/UTC
        stats open-window 2 sample-interval 77 size 10
        country-code us
        sensor-server 1 ip 172.16.10.7
        channel-list 2.4GHz 1,2
        override-wlan test vlan-pool 8
        mac-name 00-04-96-4A-A7-08 5.8TestAP
        neighbor-info-interval 50
    rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes device’s configured timezone</td>
</tr>
</tbody>
</table>
7.2.21 trustpoint (device-config-mode)

Assigns trustpoints to validate various services, such as HTTPS, RADIUS CA, RADIUS server, external LDAP server, etc.

For more information on digital certificates and certificate authorities, see trustpoint (profile-config-mode).

**NOTE:** Certificates/trustpoints used in this command should be verifiable as existing on the device.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
trustpoint [cloud-client|cmp-auth-operator|https|radius-ca|radius-ca-ldaps|
radius-server|radius-server-ldaps] <TRUSTPOINT-NAME>
```

**Parameters**

- `trustpoint [cloud-client|cmp-auth-operator|https|radius-ca|radius-ca-ldaps|radius-server|radius-server-ldaps] <TRUSTPOINT-NAME>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>trustpoint</td>
<td>Assigns trustpoints to validate various services. The assigned trustpoint is used as the CA for validating the services.</td>
</tr>
<tr>
<td>cloud-client</td>
<td>Assigns trustpoint to validate cloud client. The trustpoint should be existing and installed on the device. <strong>Note:</strong> Use this option on cloud-enabled access points and cloud-adopted, to secure the communication between the cloud AP and cloud client. The trustpoint should be existing and installed on the AP. The cloud-enabled access points are AP7502, AP7522, AP7532, and AP7562. For local-controller adopted APs, this configuration is not required.</td>
</tr>
<tr>
<td>cmp-auth-operator</td>
<td>Assigns an existing trustpoint to validate CMP auth operator. Once validated, CMP is used to obtain and manage digital certificates in a PKI network. Digital certificates link identity information with a public key enclosed within the certificate, and are issued by the CA. Use this command to specify the CMP-assigned trustpoint. When specified, devices send a certificate request to the CMP supported CA server, and download the certificate directly from the CA server. CMP supports multiple request options through for device communicating to a CMP supported CA server. The device can initiate a request for getting the certificates from the server. It can also auto update the certificates which are about to expire. <strong>Note:</strong> When configured, this cmp-auth-operator trustpoint setting overrides the profile-level configuration.</td>
</tr>
<tr>
<td>https</td>
<td>Assigns an existing trustpoint to validate HTTPS</td>
</tr>
<tr>
<td>radius-ca</td>
<td>Assigns an existing trustpoint to validate client certificates in EAP</td>
</tr>
<tr>
<td>radius-ca-ldaps</td>
<td>Assigns an existing trustpoint to validate external LDAP server</td>
</tr>
</tbody>
</table>
Examples

A device’s default HTTPS, RADIUS, and CMP certificate/trustpoint configuration is as follows:

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#show context include-factory | include trustpoint
trustpoint https default-trustpoint
no trustpoint radius-ca
trustpoint radius-server default-trustpoint
no trustpoint radius-ca-ldaps
trustpoint radius-server-ldaps default-trustpoint
no trustpoint cmp-auth-operator
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#
```

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#trustpoint https test
```

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#trustpoint https test
```

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#trustpoint https test
```

```
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#
```

radius-server Assigns an existing trustpoint to validate RADIUS server certificate

radius-server-ldaps Assigns an existing trustpoint to RADIUS server certificate to validate LDAP server

<table>
<thead>
<tr>
<th>&lt;TRUSTPOINT-NAME&gt;</th>
<th>The following keyword is common to all of the above parameters:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;TRUSTPOINT-NAME&gt; – After selecting the service to validate, specify the trustpoint name (should be existing and stored on the device).</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** By default, the system assigns the default-trustpoint to validate the following: https, radius-server, and radius-server-ldaps.
7.2.22 mirror

Device Config Commands

Port mirroring enables forwarding of copies of incoming and/or outgoing packets from one or more ports in the switch to a specified destination port. The destination port serves as a duplicate image of the source ports and can be used to send packets to a network diagnostic tool without disrupting the behavior on the original port. Common diagnostic tools include network analyzers, remote monitoring probes, and IDS/IPS security devices. This feature facilitates network monitoring.

The NX4524 and NX6524 series service platforms support port mirroring. These devices mirror data packets transmitted or received on any of their GE ports (GE port 1 - 24). Both transmit and receive packets can be mirrored from a source to a destination port as needed to provide traditional spanning functionality on the 24 GE ports.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

---

NOTE: Port mirroring is not supported on NX4500 or NX6500 models, as they only support GE ports 1 - 2. Additionally, port mirroring is not supported on uplink (up) ports or wired ports on any controller or service platform model.

---

Syntax

mirror interface [<INTERFACE-NAME>|ge <1-24>] to interface [<INTERFACE-NAME>|ge <1-24>] {direction [any|inbound|outbound]}

Parameters


| mirror interface [<INTERFACE-NAME>|ge <1-24>] | Identifies the GE port used as the data source to span packets to the selected destination port. Use one of the following options to identify the source port:
| | • <INTERFACE-NAME> – Specifies the source port name
| | • ge <1-24> – Specifies the source GE port index
| | Note: A source port cannot be a destination port.
| | Note: The source ports can be on the same or different VLANs.

| to interface [<INTERFACE-NAME>|ge <1-24>] | Selects the GE port used as the port destination to span packets from the selected source. Use one of the following options to identify the destination port:
| | • <INTERFACE-NAME> – Specifies the destination port name
| | • ge <1-24> – Specifies the destination GE port index
| | The destination port serves as a duplicate image of the source port and can be used to send packets to a network diagnostic without disrupting the behavior on the original port. The destination port transmits only mirrored traffic and does not forward received traffic. Additionally, address learning is disabled on the destination port. The destination port is also referred to as the Mirror-to-Port (MTP).

| direction [any|inbound|outbound] | Optional. Defines the direction data packets are spanned from the selected source to the defined destination. The packets spanned from the selected source to the destination depend on whether Inbound, Outbound or Any is selected as the direction.
| | • any – Spans packets in either direction (inbound and outbound)
| | • inbound – Spans received packets only
| | • outbound – Spans transmitted packets only
Usage Guidelines
All mirroring sessions must use the same destination port for packet capture.

Examples
nx4524-470984(config-device-B6-22-D9-47-09-84)#mirror interface ge 3 to interface ge 24
direction any

nx4524-470984(config-device-B6-22-D9-47-09-84)#mirror interface ge 5 to interface ge 24
direction inbound

nx4524-470984(config-device-B6-22-D9-47-09-84)#mirror interface ge 7 to interface ge 24
direction outbound

nx4524-470984#show mirroring
Session Source Destination Direction
1 ge3 ge24 any
2 ge7 ge24 inbound
3 ge5 ge24 outbound

Related Commands

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables data packets mirroring on GE ports</td>
</tr>
</tbody>
</table>
7.2.23 raid

Device Config Commands

Enables chassis alarm that sounds when events are detected that degrade RAID support (drive content mirroring) on a service platform

The NX9000 (NX9000, NX9500 and NX9510) series service platforms include a single Intel MegaRAID controller (virtual drive) with RAID-1 mirroring support enabled. The online virtual drive supports up to two physical drives that could require hot spare substitution if a drive were to fail. The WiNG software allows you to manage the RAID controller event alarm and syslogs supporting the array hardware from the service platform user interface without rebooting the service platform BIOS.

Although RAID controller drive arrays are available only on the NX9000 series service platforms, they can be administrated on behalf of a NX9000 profile by a different model service platform or wireless controller.

For more information on RAID, see raid.

Supported in the following platforms:
- Service Platforms — NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

raid alarm enable

Parameters

- raid alarm enable

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>alarm enable</td>
<td>Enables audible alarm, which is triggered a RAID drives fails. When triggered the alarm can be disabled by executing the raid &gt; silence command in the device's Priv Exec mode.</td>
</tr>
</tbody>
</table>

Examples

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#raid alarm enable

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#show context

nx9000 B4-C7-99-6C-88-09
use profile default-nx9000
use rf-domain default
hostname nx9500-6C8809
ip default-gateway 192.168.13.2
interface gel
  switchport mode access
  switchport access vlan 1
interface vlan1
  ip address 192.168.13.13/24
logging on
logging console warnings
logging buffered warnings
raid alarm enable

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables RAID alarm</td>
</tr>
</tbody>
</table>
7.3 T5 Profile Config Commands

A T5 controller uses the IPX operating system to manage its connected radio devices, as opposed to the WiNG operating used by RFS wireless controllers and NX service platforms. However, a T5 controller, once enabled as a supported external device, can provide data to WiNG to assist in a T5's management within a WiNG supported subnet populated by both types of devices. The Customer Premises Equipment (CPEs) are the T5 controller managed radio devices using the IPX operating system. These CPEs use a DSL as their high speed Internet access mechanism using the CPE’s physical wallplate connection and phone jack.

To navigate to this instance, use the following commands:

```
<DEVICE>(config-profile-<PROFILE-NAME>)##
```

T5 Profile Mode commands:

- `cpe`: T5 CPE configuration
- `interface`: Select an interface to configure
- `ip`: Internet Protocol (IP)
- `no`: Negate a command or set its defaults
- `ntp`: Configure NTP
- `override-wlan`: Configure RF Domain level overrides for wlan
- `t5`: T5 configuration
- `t5-logging`: Modify message logging facilities
- `use`: Set setting to use
- `clrscr`: Clears the display screen
- `commit`: Commit all changes made in this session
- `do`: Run commands from Exec mode
- `end`: End current mode and change to EXEC mode
- `exit`: End current mode and down to previous mode
- `help`: Description of the interactive help system
- `revert`: Revert changes
- `service`: Service Commands
- `show`: Show running system information
- `write`: Write running configuration to memory or terminal

The following table summarizes T5 profile configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>cpe</code></td>
<td>Configures T5 CPE related settings (IP address range and VLAN)</td>
<td>page 7-498</td>
</tr>
<tr>
<td><code>interface</code></td>
<td>Configures the T5 controller’s interfaces</td>
<td>page 7-500</td>
</tr>
<tr>
<td><code>ip</code></td>
<td>Configures the default gateway’s IP address</td>
<td>page 7-502</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Removes or reverts this T5 controller profile settings</td>
<td>page 7-503</td>
</tr>
<tr>
<td><code>ntp</code></td>
<td>Configures the NTP server associated with this T5 profile</td>
<td>page 7-504</td>
</tr>
<tr>
<td><code>override-wlan</code></td>
<td>Configures the RF Domain level overrides for applied on a WLAN on this T5 profile</td>
<td>page 7-505</td>
</tr>
<tr>
<td><code>t5</code></td>
<td>Configures the logged T5 controller’s country of operation</td>
<td>page 7-506</td>
</tr>
<tr>
<td><code>t5-logging</code></td>
<td>Configures a maximum of 5 (five) remote hosts capable of receiving syslog messages from this selected T5 controller</td>
<td>page 7-507</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Defines this T5 profile’s management settings</td>
<td>page 7-508</td>
</tr>
</tbody>
</table>
7.3.1 cpe

T5 Profile Config Commands
Confirms T5 CPE related settings. This command is available both in the T5 profile and T5 device contexts

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax T5 Profile & T5 Device Context

cpe [address led]
cpe address vlan <1-4094> <START-IP> <END-IP>
cpe led cpe <cpe1-24>
The following commands are specific to the T5 device context:
cpe [boot|reload|upgrade]
cpe boot system <cpe1-24> <primary|secondary>
cpe reload <cpe1-24>
cpe <cpe1-24> upgrade <IMAGE-LOCATION>

Parameters
- cpe address vlan <1-4094> <START-IP> <END-IP>

<table>
<thead>
<tr>
<th>cpe address</th>
<th>Configures the range of addresses that can be assigned to adopted CPEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Configures the VLAN assigned to the CPEs managed by this T5 controller</td>
</tr>
<tr>
<td>&lt;START-IP&gt; &lt;END-IP&gt;</td>
<td>Configures the range of IP addresses that can be assigned to the CPEs managed by this T5 controller</td>
</tr>
</tbody>
</table>
  - <START-IP> – Specify the first IP address in the range.
  - <END-IP> – Specify the last IP address in the range.

- cpe led cpe <cpe1-24>

<table>
<thead>
<tr>
<th>cpe led</th>
<th>Enables flashing of LEDs on specified CPEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpe &lt;cpe1-24&gt;</td>
<td>Identifies the CPE(s) on which the operation is performed</td>
</tr>
</tbody>
</table>
  - <cpe1-24> – Configures the CPE’s ID from cpe1 - cpe24. To enable led flashing on all adopted CPEs, enter cpe1-X, where X is the total number of adopted CPEs. For example, if CPEs 1, 2, 3, 4, & 5 are adopted and ready, then enter this value as cpe1-5.

- cpe boot system <cpe1-24> <primary|secondary>

<table>
<thead>
<tr>
<th>cpe boot system</th>
<th>Changes the image used by a CPE to boot. When reloading, the CPE uses the specified image.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;cpe1-24&gt;</td>
<td>Identifies the CPE(s) on which the operation is performed</td>
</tr>
</tbody>
</table>
  - <cpe1-24> – Configures the CPE’s ID from cpe1 - cpe24. To enable led flashing on all adopted CPEs, enter cpe1-X, where X is the total number of adopted CPEs. For example, if CPEs 1, 2, 3, 4, & 5 are adopted and ready, then enter this value as cpe1-5.
| **<primary|secondary>** | Select the next boot image |
|--------------------|----------------------------|
| • primary – Uses the primary image when reloading |
| • secondary – Uses the secondary image when reloading |

**cpe reload <cpe1-24>**

- Reloads all or specified CPEs.

**cpe reload**

- Identifies the CPE(s) to reload
  - **<cpe1-24>** – Configures the CPE’s ID from cpe1 - cpe24. To enable led flashing on all adopted CPEs, enter cpe1-X, where X is the total number of adopted CPEs. For example, if CPEs 1, 2, 3, 4, & 5 are adopted and ready, then enter this value as cpe1-5.

**cpe <cpe1-24> upgrade <IMAGE-LOCATION>**

- Upgrades all or specified CPEs
  - **<cpe1-24>** – Identifies the CPE(s) to upgrade. Specify the CPE’s ID from cpe1 - cpe24. To enable led flashing on all adopted CPEs, enter cpe1-X, where X is the total number of adopted CPEs. For example, if CPEs 1, 2, 3, 4, & 5 are adopted and ready, then enter this value as cpe1-5.
  - upgrade <IMAGE-LOCATION> – Uses the image specified here to upgrade identified CEPs.
    - **<IMAGE-LOCATION>** – Specify the firmware image location using one of the following options:
      - path/file
      - tftp://<IP>/path/file
      - ftp://<user>:<passwd>@<IP>/path/file

**Examples**

nx9500-6C8809(config-profile-T5TestProfile)#cpe address vlan 200 192.168.13.26 192.168.13.30

nx9500-6C8809(config-profile-T5TestProfile)#show context profile t5 T5TestProfile
no autoinstall configuration
no autoinstall firmware
interface vlan1
interface vlan4090
interface fe 5 2
interface radio 11 1
interface fe 9 2
interface radio 18 1
interface fe 9 1
use firewall-policy default
service pm sys-restart
cpe address vlan 200 192.168.13.26 192.168.13.30
nx9500-6C8809(config-profile-T5TestProfile)#
### 7.3.2 interface

#### T5 Profile Config Commands

Configures the T5 controller’s interfaces

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
interface [<WORD>|dsl|fe|ge|radio|vlan]

interface [<WORD>|dsl <1-24>|fe <1-24> <1-2>|ge <1-2>|radio <1-24> <1-2>|vlan <1-4094>]
```

**Parameters**

- **interface [<WORD>|dsl <1-24>|fe <1-24> <1-2>|ge <1-2>|radio <1-24> <1-2>|vlan <1-4094>]**
  - `<WORD>` Configures the interface identified by the `<WORD>` keyword
  - **dsl <1-24>** Configures the specified DSL interface. A T5 controller uses the IPX operating system to manage its connected radio devices, as opposed to the WiNG operating used by controllers and NX service platforms. However, a T5 controller, once enabled as a supported external device, can provide data to WiNG to assist in a T5’s management within a WiNG supported subnet populated by both types of devices. The CPEs are the T5 controller managed radio devices using the IPX operating system. These CPEs use DSL as their high speed Internet access mechanism using the CPE’s physical wallplate connection and phone jack.
    - `<1-24>` – Specify the DSL port index from 1 - 24.

- **fe <1-24> <1-2>** Configures the specified FastEthernet interface. The T5 controller has the following FastEthernet port designations: fe1-fe2 (fe1-fe2 are for up to 24 CPE devices managed by a T5 controller).
  - `<1-24>` – Specify the DSL port index from 1 - 24.
  - `<1-2>` – Specify the FastEthernet interface to configure.
  - **Note:** In the FastEthernet interface configuration mode, specify the interface settings.

- **ge <1-2>** Configures the specified GigabitEthernet interface.
  T5 controllers have two Ethernet port designations, These are ge1 and ge2. The GE ports can be RJ-45 or fiber ports supporting 10/100/1000Mbps.
  - `<1-2>` – Specify the interface index from 1 - 2.
  - **Note:** In the GigabitEthernet interface configuration mode, specify the interface settings.

- **radio <1-24> <1-2>** Configures the specified radio interface. T5 controller managed CPE device radios can have their radio configurations overridden once their radios have successfully associated and have been provisioned by the adopting controller, service platform, or peer model AP controller access point.
  - `<1-24>` – Specify the radio interface index from 1 - 24.
  - `<1-2>` – Allows the second radio to be specified as a radio interface. For example, this is “interface radio X Y” where ‘X’ is the DSL line number and ‘Y’ is the radio interface (number).
Examples

rfs7000-37FABE(config-profile-t5Profile)#interface dsl 1

rfs7000-37FABE(config-profile-t5Profile-if-dsl1)#?

Interface configuration commands:

- **description**  Port description
- **ds-interleaver**  Enable impulse noise protection in the downstream direction
- **ds-max-datarate**  Configure maximum allowed downstream rate for the interface
- **ds-min-margin**  Configure the minimum downstream signal-to-noise (SNR) ratio margin
- **ds-target-margin**  Configure the desired downstream signal-to-noise (SNR) ratio margin
- **duplex**  Set duplex to interface
- **flowcontrol**  Set flowcontrol to interface
- **line-power**  Use the line-power command to apply power to the interface
- **no**  Negate a command or set its defaults
- **qos**  QOS settings
- **shutdown**  Shutdown the selected interface
- **speed**  Configure speed
- **switchport**  Set switching mode characteristics
- **us-interleaver**  Enable impulse noise protection in the upstream direction
- **us-max-datarate**  Configure maximum allowed upstream rate for the interface
- **us-min-margin**  Configure the minimum upstream signal-to-noise (SNR) ratio margin
- **us-target-margin**  Configure the desired upstream signal-to-noise (SNR) ratio margin
- **clrscr**  Clears the display screen
- **commit**  Commit all changes made in this session
- **do**  Run commands from Exec mode
- **end**  End current mode and change to EXEC mode
- **exit**  End current mode and down to previous mode
- **help**  Description of the interactive help system
- **revert**  Revert changes
- **service**  Service Commands

Related Commands

- **no**  Removes the selected interface configuration on the T5 device
7.3.3 *ip*

### T5 Profile Config Commands

Configures the default gateway’s IP address

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
ip default-gateway <IP>
```

**Parameters**

- `ip default-gateway <IP>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip default-gateway &lt;IP&gt;</td>
<td>Enter the default gateway’s IP address in the A.B.C.D format.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile-t5Profile)#ip default-gateway 192.168.13.7

nx9500-6C8809(config-profile-t5Profile)#show context
profile t5 t5Profile
  ip default-gateway 192.168.13.7
  no autoinstall configuration
  no autoinstall firmware
  interface vlan1
  interface vlan4090
  interface fe 5 2
  interface ge 2
  interface ge 1
  interface fe 5 1
  --More--
nx9500-6C8809(config-profile-t5Profile)#
```
7.3.4 no

**T5 Profile Config Commands**

Removes or reverts this T5 controller profile settings

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [cpe|interface|ntp|override-wlan|t5-logging|use]
no cpe led cpe <1-24>
no interface vlan <2-4094>
no ntp server <IP>
no override-wlan <WLAN-NAME> vlan
no t5-logging host <IP>
no use management-policy
```

**Parameters**
- `no <PARAMETERS>`

**Examples**

```
nx9500-6C8809(config-profile-t5Profile)#show context
profile t5 t5Profile
  ip default-gateway 192.168.13.7
  no autoinstall configuration
  no autoinstall firmware
  interface vlan1
  interface vlan4090
  ....................................................
  use firewall-policy default
  ntp server 192.168.13.2
  service pm sys-restart

nx9500-6C8809(config-profile-t5Profile)#
```

```
nx9500-6C8809(config-profile-t5Profile)#no ntp server 192.168.13.2
```

```
nx9500-6C8809(config-profile-t5Profile)#show context
profile t5 t5Profile
  ip default-gateway 192.168.13.7
  no autoinstall configuration
  no autoinstall firmware
  interface vlan1
  interface vlan4090
  ....................................................
  use firewall-policy default
  service pm sys-restart

nx9500-6C8809(config-profile-t5Profile)#
```
### 7.3.5 ntp

#### T5 Profile Config Commands

Configures the NTP server associated with this T5 profile. T5 controllers, using this profile, will obtain their system time from the specified NTP server resources.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
ntp server <IP>
```

**Parameters**

- `ntp server <IP>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ntp server &lt;IP&gt;</code></td>
<td>Specify the NTP server’s IP address. You can specify a maximum of 3 (three) NTP server resources.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
nx9500-6C8809(config-profile-t5Profile)# ntp server 192.168.13.2

nx9500-6C8809(config-profile-t5Profile)# show context
profile t5 t5Profile
  ip default-gateway 192.168.13.7
  no autoinstall configuration
  no autoinstall firmware
  interface dsl 5
  ....................................................
  use firewall-policy default
  ntp server 192.168.13.2
  service pm sys-restart
nx9500-6C8809(config-profile-t5Profile)#
```

**Related Commands**

- `no` Removes the NTP server’s IP address
### 7.3.6 override-wlan

#### T5 Profile Config Commands

Use this option to configure RF Domain level configuration for WLAN. The override configured here are applied to all T5 devices using this T5 profile.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

override-wlan <WLAN-NAME> vlan <1-4094>

**Parameters**

- override-wlan <WLAN-NAME> vlan <1-4094>

<table>
<thead>
<tr>
<th>override-wlan &lt;WLAN-NAME&gt;</th>
<th>Overrides the specified WLAN's VLAN configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Specify the new VLAN option</td>
</tr>
</tbody>
</table>

**Examples**

The following example displays the WLAN SJOffWLan configuration:

```bash
nx9500-6C8809(config-wlan-SJOffWLan)#show context
wlan SJOffWLan
description "SJ Office WLAN"
ssid SJOffWLan
vlan 468
bridging-mode local
encryption-type ccmp
authentication-type eap-psk
use aaa-policy test
nx9500-6C8809(config-wlan-SJOffWLan)#
```

The following example overrides the SJOffWLan WLAN's VLAN configuration on the T5 profile:

```bash
nx9500-6C8809(config-profile-testT5)#override-wlan SJOffWLan vlan 30
nx9500-6C8809(config-profile-testT5)#show context include-factory | include override-wlan
override-wlan SJOffWLan vlan 30
nx9500-6C8809(config-profile-testT5)#
```

**Related Commands**

| no | Removes the RF Domain level overrides for applied on a WLAN on this T5 profile |
7.3.7 \texttt{t5}

\textit{T5 Profile Config Commands}

Configures this T5 controller's country of operation

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

\textbf{Syntax}

\texttt{t5 country-code <WORD>}

\textbf{Parameters}

- \texttt{t5 country-code <WORD>}

\begin{tabular}{|l|l|}
\hline
\textbf{country-code <WORD>} & Configures the 2 letter ISO-3166 country code for this T5 controller \\
\hline
\end{tabular}

\textbf{Examples}

\texttt{nx9500-6C8809(config-profile-T5TestProfile)#t5 country-code us}

\texttt{nx9500-6C8809(config-profile-T5TestProfile)#show context profile t5 T5TestProfile}
no autoinstall configuration
no autoinstall firmware
interface vlan1
interface vlan4090
interface fe 5 2
..........................................................interface fe 9 1
use firewall-policy default
service pm sys-restart
\texttt{t5 country-code US}
cpe address vlan 200 192.168.13.26 192.168.13.30
\texttt{nx9500-6C8809(config-profile-T5TestProfile)#}
7.3.8 t5-logging

**T5 Profile Config Commands**

Configures a maximum of 5 (five) remote hosts capable of receiving syslog messages from this selected T5 controller.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

t5-logging host <IP> severity [error|info|notice|trace|warning] facility [local0|local1|local2|local3|local4|local5|local6|local7]

**Parameters**

- **t5-logging host <IP> severity [error|info|notice|trace|warning] facility [local0|local1|local2|local3|local4|local5|local6|local7]**
  - **t5-logging host <IP>** — Configures the external syslog remote host resource's IP address. This is the host dedicated to receive T5 syslog messages.

  - **severity [error|info|notice|trace|warning]**
    - Configures the syslog message filtering severity level. The options are:
      - **Error** — Only forwards error and above syslog event messages.
      - **Info** — Only forwards informational and above syslog event messages.
      - **notice** — Only forwards syslog notices relating to general device operational events. These are events that are of more interest than the “info” events.
      - **trace** — Only forwards trace routing event messages
      - **warning** — Only forwards warnings and above syslog event messages

  - **facility [local0|local1|local2|local3|local4|local5|local6|local7]**
    - Configures the facility level for log messages sent to the syslog server. The facility level specifies the type of program logging the message. Specifying the facility level allows the configuration file to specify that message handling will vary with varying facility type. The options are: local0, local1, local2, local3, local4, local5, local6, local7. The default value is local7.

**Examples**

```plaintext
nx9500-6C8809(config-profile-T5TestProfile)#t5-logging host 192.168.13.10 severity warning facility local6

nx9500-6C8809(config-profile-T5TestProfile)#show context profile t5 T5TestProfile
  t5-logging host 192.168.13.10 severity warning facility local6
  no autoinstall configuration
  ............................................................
  no autoinstall firmware
t5 country-code US
cpe address vlan 200 192.168.13.26 192.168.13.30
nx9500-6C8809(config-profile-T5TestProfile)#
```

**Related Commands**

- **no**
  - Modifies message logging severity level and facilities
7.3.9 use

- **T5 Profile Config Commands**

Associates a management policy with this T5 profile. The specified policy is applied to all T5 controllers using this profile.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
use management-policy <POLICY-NAME>
```

**Parameters**
- `use management-policy <POLICY-NAME>`

**Examples**

```
nx9500-6C8809(config-profile-t5Profile)#use management-policy default
```

Trustpoints HTTPS Server and RSA keys for SSH can be configured with 'trustpoint' and 'rsa-key' commands in device context.

```
nx9500-6C8809(config-profile-t5Profile)#
```

**Related Commands**

- **no**

Removes the management policy used with this T5 profile
7.4 EX3524 & EX3548 Profile/Device Config Commands

Creates a new EX3524 and EX3548 profile and enters its configuration mode.

To navigate to this instance, use the following commands:

```
<DEVICE>(config)#profile ex35xx <EX35XX-PROFILE-NAME>
```

Where ex35xx can be a EX3524 or a EX3548 device type.

```
<DEVICE>(config-profile-<EX35XX-PROFILE-NAME>)#?
```

**EX35XX Profile Mode commands:**

- `interface`: Select an interface to configure
- `ip`: Internet Protocol (IP)
- `no`: Negate a command or set its defaults
- `power`: EX3500 Power over Ethernet Command
- `upgrade`: Configures upgrade option for ex3500 system
- `use`: Set setting to use
- `clrscr`: Clears the display screen
- `commit`: Commit all changes made in this session
- `do`: Run commands from Exec mode
- `end`: End current mode and change to EXEC mode
- `exit`: End current mode and down to previous mode
- `help`: Description of the interactive help system
- `revert`: Revert changes
- `service`: Service Commands
- `show`: Show running system information
- `write`: Write running configuration to memory or terminal

<DEVICE>(config-profile-<EX35XX-PROFILE-NAME>)#`

The following table summarizes EX3524 and EX3548 profile/device configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>interface</code></td>
<td>Selects an interface type and enters the selected interface’s configuration mode</td>
<td>page 7-510</td>
</tr>
<tr>
<td><code>ip</code></td>
<td>Configures the default gateway through which this EX35XX switch can reach other subnets</td>
<td>page 7-530</td>
</tr>
<tr>
<td><code>power</code></td>
<td>Enables power inline compatibility mode on this EX35XX profile</td>
<td>page 7-531</td>
</tr>
<tr>
<td><code>upgrade</code></td>
<td>Configures adopted EX35XX switch upgrade settings</td>
<td>page 7-532</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Applies an EX3500 management policy to this EX35XX profile</td>
<td>page 7-533</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Removes or reverts this EX35XX profile’s settings</td>
<td>page 7-534</td>
</tr>
</tbody>
</table>
7.4.1 interface

This command selects an interface type and enters the selected interface’s configuration mode. The EX35XX switch has GE and VLAN interfaces. Select the interface type and provide the interface ID to enter its configuration mode.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface</td>
<td>Selects an interface type and enters the selected interface’s configuration mode</td>
<td>page 7-511</td>
</tr>
<tr>
<td>interface-ge-config commands</td>
<td>Summarizes GE interface configuration mode commands</td>
<td>page 7-513</td>
</tr>
<tr>
<td>interface-vlan-config commands</td>
<td>Summarizes VLAN interface configuration mode commands</td>
<td>page 7-526</td>
</tr>
</tbody>
</table>
7.4.1.1 interface

interface Selects the EX35XX interface type and enters the selected interface’s configuration mode

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax
interface [ge 1 <1-48>|vlan <1-4094>]

Parameters
- interface [ge 1 <1-48>|vlan <1-4094>]

<table>
<thead>
<tr>
<th>interface</th>
<th>Selects the EX35XX interface type and enters its configuration mode. The interface options available are: GE and VLAN</th>
</tr>
</thead>
</table>
| ge 1 <1-48> | Selects a GE interface to configure  
  - 1 – Configures the GE interface unit identifier as 1  
  - <1-48> – Configures the physical port number from 1 - 24/48  
  **Note:** For the EX3524 model switch the GE port range is 1-24, and for the EX3548 it is 1-48. |
| vlan <1-4094> | Selects a VLAN interface to configure  
  - <1-4094> – Specify the VLAN interface ID from 1 - 4094. |

Examples
nx4500-5CFA8E(config-profile-testEX35XX)#interface vlan 1
nx4500-5CFA8E(config-profile-testEX35XX-if-vlan1)#?
commands:
  ip Internet Protocol (IP)
  no Negate a command or set its defaults
  clrscr Clears the display screen
  commit Commit all changes made in this session
  do Run commands from Exec mode
  end End current mode and change to EXEC mode
  exit End current mode and down to previous mode
  help Description of the interactive help system
  revert Revert changes
  service Service Commands
  show Show running system information
  write Write running configuration to memory or terminal

nx4500-5CFA8E(config-profile-testEX35XX-if-vlan1)#

nx4500-5CFA8E(config-profile-testEX35XX)#interface ge 1 1
nx4500-5CFA8E(config-profile-testEX35XX-if-ge1-1)#?
commands:
  access-group Access group to bind a port to an ACL name
  no Negate a command or set its defaults
  port Configures the characteristics of the port
  power EX3500 Power over Ethernet Command
  shutdown Shutdown the selected interface
  speed-duplex Configures speed and duplex operation
  switchport Configures switch mode characteristics
  use Set setting to use
  clrscr Clears the display screen
  commit Commit all changes made in this session
**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes this interface (GE/VLAN) settings from the EX35XX profile or device</td>
</tr>
<tr>
<td><code>interface-ge-config commands</code></td>
<td>Summarizes GE interface configuration mode commands</td>
</tr>
<tr>
<td><code>interface-vlan-config commands</code></td>
<td>Summarizes VLAN interface configuration mode commands</td>
</tr>
</tbody>
</table>
7.4.1.2 interface-ge-config commands

The following table lists the EX35XX GE interface configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>access-group</td>
<td>Binds an EX3500 ACL to the selected port</td>
<td>page 7-514</td>
</tr>
<tr>
<td>port</td>
<td>Enables port monitoring on the selected port</td>
<td>page 7-515</td>
</tr>
<tr>
<td>power</td>
<td>Turns power on or off for the selected port</td>
<td>page 7-517</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down the selected port</td>
<td>page 7-519</td>
</tr>
<tr>
<td>speed-duplex</td>
<td>Configures the speed and duplex mode of the selected port when auto-</td>
<td>page 7-520</td>
</tr>
<tr>
<td></td>
<td>negotiation is disabled. Auto-negotiation is enabled by default.</td>
<td></td>
</tr>
<tr>
<td>switch-port</td>
<td>Configures the switch mode characteristics of the selected port</td>
<td>page 7-521</td>
</tr>
<tr>
<td>use</td>
<td>Applies a EX3500 QoS policy map with the selected port</td>
<td>page 7-523</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts the selected port’s settings</td>
<td>page 7-524</td>
</tr>
</tbody>
</table>
### 7.4.1.2.1 access-group

**interface-ge-config commands**

Binds an EX3500 ACL to the selected port

When applied to the port, the ACL takes effect. Only one ACL can be bound to a port at a time. In case you bind a new ACL to a port with an existing ACL binding, the old binding is replaced with the new one.

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

access-group [ex3500-ext-access-list|ex3500-std-access-list|mac-access-list] <ACL-NAME> in {time-range <TIME-RANGE-NAME>}

**Parameters**

- **access-group [ex3500-ext-access-list|ex3500-std-access-list|mac-access-list] <ACL-NAME>** in {time-range <TIME-RANGE-NAME>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>access-group</td>
<td>Binds a EX3500 ACL with this GE port. Select ACL type and specify the ACL name. The ACL should be existing and configured.</td>
</tr>
<tr>
<td>ex3500-ext-access-list</td>
<td>Binds an existing and configured EX3500 extended ACL</td>
</tr>
<tr>
<td>&lt;ACL-NAME&gt;</td>
<td>• &lt;ACL-NAME&gt; – Specify the ACL name.</td>
</tr>
<tr>
<td>ex3500-std-access-list</td>
<td>Binds an existing and configured EX3500 standard ACL</td>
</tr>
<tr>
<td>&lt;ACL-NAME&gt;</td>
<td>• &lt;ACL-NAME&gt; – Specify the ACL name.</td>
</tr>
<tr>
<td>mac-access-list</td>
<td>Binds an existing and configured EX3500 MAC ACL</td>
</tr>
<tr>
<td>&lt;ACL-NAME&gt;</td>
<td>• &lt;ACL-NAME&gt; – Specify the MAC ACL name.</td>
</tr>
<tr>
<td>in</td>
<td>Applies the specified ACL to all incoming packets</td>
</tr>
<tr>
<td>time-range &lt;TIME-RANGE-NAME&gt;</td>
<td>Optional. Associates a EX3500 absolute or periodic time range with this access group. The specified ACL is bound to the port during the time period specified by the associated time range.</td>
</tr>
<tr>
<td></td>
<td>• &lt;TIME-RANGE-NAME&gt; – Specify the time range name (should be existing and configured).</td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C8809(config-profile-testEX3524-if-gel-20)#access-group ex3500-ext-access-list EX3500_ACL_EXT_1 in time-range EX3500_TimeRange_01

nx9500-6C8809(config-profile-testEX3524-if-gel-20)#show context interface ge 1 20

access-group ex3500-ext-access-list EX3500_ACL_EXT_1 in time-range EX3500_TimeRange_01

nx9500-6C8809(config-profile-testEX3524-if-gel-20)#

**Related Commands**

- **no** Removes the GE port EX3500 ACL binding
7.4.1.2.2 port

*interface-ge-config commands*

Enables port monitoring on the selected port. This allows the port to monitor specified ports and/or MAC address(es). When enabled, the switch sends a copy of the network packets seen on the specified switch port (or VLAN interface) to the monitoring switch port. These packets are analyzed and debugged to provide vital information, such as network performance, intrusion alerts, etc.

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

```
port monitor [ethernet|ex3500-ext-access-list|ex3500-std-access-list|mac-access-list|mac-address|vlan]
```

```
port monitor ethernet 1 <1-52> {both|rx|tx}
```

```
port monitor [ex3500-ext-access-list|ex3500-std-access-list|mac-access-list]<ACL-NAME>
```

```
port monitor mac-address <MAC>
```

```
port monitor vlan <1-4094>
```

**Parameters**
- `port monitor ethernet 1 <1-52> {both|rx|tx}`

<table>
<thead>
<tr>
<th>port monitor ethernet 1 &lt;1-52&gt;</th>
<th>Configures the characteristics of this GE port</th>
</tr>
</thead>
<tbody>
<tr>
<td>• monitor – Enables monitoring of another port</td>
<td></td>
</tr>
<tr>
<td>• ethernet 1 – Selects Ethernet interface and configures the port identifier as 1</td>
<td></td>
</tr>
<tr>
<td>• &lt;1-52&gt; – Configures the Ethernet unit number from 1 - 52</td>
<td></td>
</tr>
</tbody>
</table>

| {both|rx|tx} | After specifying the port, optionally configure the following: |
|------------|---------------------------------------------------------------|
| • both – Optional. Monitors both incoming and outgoing traffic |
| • rx – Optional. Monitors only incoming traffic |
| • tx – Optional. Monitors only outgoing traffic |

- `port monitor [ex3500-ext-access-list|ex3500-std-access-list|mac-access-list]<ACL-NAME>`

**Syntax**

```
port monitor [ethernet|ex3500-ext-access-list|ex3500-std-access-list|mac-access-list]
```

```
port monitor ethernet 1 <1-52> {both|rx|tx}
```

```
port monitor [ex3500-ext-access-list|ex3500-std-access-list|mac-access-list]
```

```
<ACL-NAME>
```

**Parameters**
- `port monitor [ex3500-ext-access-list|ex3500-std-access-list|mac-access-list]<ACL-NAME>`

| port monitor [ex3500-ext-access-list|ex3500-std-access-list|mac-access-list]<ACL-NAME> | Configures the characteristics of this GE port  |
|--------------------------------------------------------------------------------|----------------------------------------------|
| • monitor – Enables monitoring of another port |

| [ex3500-ext-access-list|ex3500-std-access-list|mac-access-list]<ACL-NAME> | After specifying the port, apply one of the following ACLs: |
|--------------------------------------------------------------------------------|---------------------------------------------------------------|
| • ex3500-ext-access-list – Applies a EX3500 extended ACL |
| • ex3500-std-access-list – Applies a EX3500 standard ACL |
| • mac-access-list – Applies a MAC ACL with EX3500 deny or permit rules |
| • <ACL-NAME> – Specify the ACL name (should be existing and configured). |

- `port monitor mac-address <MAC>`

<table>
<thead>
<tr>
<th>port monitor mac-address &lt;MAC&gt;</th>
<th>Configures the characteristics of this GE port</th>
</tr>
</thead>
<tbody>
<tr>
<td>• monitor – Enables monitoring of another port</td>
<td></td>
</tr>
</tbody>
</table>
### Examples

```
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#port monitor vlan 20

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#show context
interface ge 1 20
  access-group ex3500-ext-access-list EX3500_ACL_EXT_1 in time-range EX3500_TimeRange_01
  port monitor vlan 20
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables port monitoring on the selected port and removes the settings</td>
</tr>
</tbody>
</table>
7.4.1.2.3 power

interface-ge-config commands

Enables power allocation to the selected port. When enabled, the power is allocated to this port. Use the command to configure the power allocation settings, such as maximum power allocated, priority level of this port in connection with power allocation, and the time range within which these power settings are applied.

This option is enabled by default.

Supported in the following platforms:

- Switches — EX3524, EX3548
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

```
power inline {maximum|priority|time-range}
```

Parameters

- power inline {maximum allocation milliwatts <3000-34200>}
- power inline {priority [critical|high|low]}
- power inline {time-range <TIME-RANGE-NAME>}

Examples

```
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#power inline maximum allocation milliwatts 30000
```

```
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#power inline priority critical
```

```
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#power inline time-range EX3500_TimeRange_01
```
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#show context
interface ge 1 20
  power inline maximum allocation milliwatts 30000
  power inline priority critical
  power inline time-range EX3500_TimeRange_01
  access-group ex3500-ext-access-list EX3500_ACL_EXT_1 in time-range EX3500_TimeRange_01
  port monitor vlan 20
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables power allocation to the selected port</td>
</tr>
</tbody>
</table>
### 7.4.1.2.4 shutdown

**interface-ge-config commands**

Shuts down the selected port

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

#### Syntax

```
shutdown
```

#### Parameters

None

#### Examples

```
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#shutdown

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#show context
  interface ge 1 20
    shutdown
    power inline maximum allocation milliwatts 30000
    power inline priority critical
    power inline time-range EX3500_TimeRange_01
    access-group ex3500-ext-access-list EX3500_ACL_EXT_1 in time-range EX3500_TimeRange_01
    port monitor vlan 20

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#
```

#### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Brings up a shutdown port</td>
</tr>
</tbody>
</table>
### 7.4.1.2.5 speed-duplex

*interface-ge-config commands*

Configures the speed and duplex mode of the selected port when auto-negotiation is disabled. Auto-negotiation is enabled by default.

This option is disabled by default.

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

```
speed-duplex [100full|100half|10full|10half]
```

**Parameters**
- `speed-duplex [100full|100half|10full|10half]`

| speed-duplex [100full|100half|10full|10half] | Configures the speed and duplex mode of the selected port to one of the following modes:
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100full – Forces 100 Mbps full-duplex operation</td>
<td>100half – Forces 100 Mbps half-duplex operation</td>
</tr>
<tr>
<td>10full – Force 10 Mbps full-duplex operation</td>
<td>10half – Force 10 Mbps half-duplex operation</td>
</tr>
</tbody>
</table>

When configured, forces the switch to operate at the specified speed and mode.

**Examples**

```
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#speed-duplex 100half

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#show context
  interface ge 1 20
  shutdown
  speed-duplex 100half
  power inline maximum allocation milliwatts 30000
  power inline priority critical
  power inline time-range EX3500_TimeRange_01
  access-group ex3500-ext-access-list EX3500_ACL_EXT_1 in time-range EX3500_TimeRange_01
  port monitor vlan 20

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#
```

**Related Commands**

- `no` | Removes the speed and duplex settings configured for this EX35XX profile
### 7.4.1.2.6 switch-port

**interface-ge-config commands**

Configures the switch mode characteristics of the selected port

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

- `switchport [allowed|l2protocol-tunnel|mode|native]`
- `switchport allowed [add <VLAN-ID>|none|remove <VLAN-ID>]`
- `switchport l2protocol-tunnel [cdp|lldp|pvst+|spanning-tree|vtp]`
- `switchport mode [access|hybrid|trunk]`
- `switchport native`

**Parameters**

- **switchport allowed [add <VLAN-ID>|none|remove <VLAN-ID>]**
  - **Configure VLAN groups on the selected interface.**
  - `add <VLAN-ID>` – Configures the list of VLAN identifiers to add. When the add option is used, the interface is assigned to the specified VLANs, and membership in all previous VLANs is retained.
  - `<VLAN-ID>` – Specify the list of VLANs to add.
  - `none` – Removes all VLANs from the current list
  - `remove <VLAN-ID>` – Configures the list of VLAN identifiers to remove. When the remove option is used, the specified VLANs are removed from the current list.
  - `<VLAN-ID>` – Specify the list of VLANs to remove.

- **switchport l2protocol-tunnel [cdp|lldp|pvst+|spanning-tree|vtp]**
  - **Enables layer 2 protocol tunneling (L2PT) for the specified protocol.**
  - Specify the protocol:
    - `cdp` – Cisco Discovery Protocol
    - `lldp` – Link Layer Discovery Protocol
    - `pvst+` – Cisco Per VLAN Spanning Tree Plus
    - `spanning-tree` – Spanning Tree (STP, RSTP, MSTP)
    - `vtp` – Cisco VLAN Trunking Protocol
  - L2PT is disabled for all of the above specified protocols by default.

- **switchport mode [access|hybrid|trunk]**
  - **Configures the VLAN membership mode for this port**
  - `access` – The port is configured as an access VLAN interface. It transmits and receives packets untagged frames on a single VLAN.
  - Contd..
• trunk – Configures the selected port as an end-point for a VLAN trunk. A trunk link is configured between two switches, and it carries frames on more than one VLANs. These frames are tagged in order to identify the source VLAN. Frames belonging to the port’s default VLAN are also transmitted as tagged frames.
• hybrid – Configures the selected port as a hybrid VLAN interface. When configured as hybrid, the port can transmit either tagged or untagged frames. This is the default setting.

Examples

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#switchport mode access

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#show context
interface ge 1 20
  shutdown
  speed-duplex 100half
  switchport mode access
  power inline maximum allocation milliwatts 30000
  power inline priority critical
  power inline time-range EX3500_TimeRange_01
  access-group ex3500-ext-access-list EX3500_ACL_EXT_1 in time-range EX3500_TimeRange_01
  port monitor vlan 20

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#

Related Commands

no

Removes the selected port’s switchport characteristics
### 7.4.1.2.7 use

Applies a EX3500 QoS policy map with the selected port

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

```
use ex3500-policy-map <EX3500-QoS-POLICY-MAP-NAME> in
```

**Parameters**

- `use ex3500-policy-map <EX3500-QoS-POLICY-MAP-NAME> in`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `use ex3500-policy-map <EX3500-QoS-POLICY-MAP-NAME> in` | Applies a EX3500 QoS policy map with the selected port  
  - `<EX3500-QoS-POLICY-MAP-NAME>` — Specify the EX3500 QoS policy map name (should be existing and configured)  
  - `in` — Applies the specified policy to traffic ingressing at the selected port. |

**Examples**

```
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#use ex3500-policy-map in test
```

```
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#show context
interface ge 1 20
  shutdown
  speed-duplex 100half
  switchport mode access
  use ex3500-policy-map in test
  power inline maximum allocation milliwatts 30000
  power inline priority critical
  power inline time-range EX3500_TimeRange_01
  access-group ex3500-ext-access-list EX3500_ACL_EXT_1 in time-range EX3500_TimeRange_01
  port monitor vlan 20
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disassociates the EX3500 QoS policy map linked to this EX3500 profile</td>
</tr>
</tbody>
</table>
7.4.1.2.8  no

interface-ge-config commands

Removes or reverts the selected port's settings

Supported in the following platforms:
  • Switches — EX3524, EX3548

Syntax

no [access-group|port|power|shutdown|speed-duplex|switchport|use]

no access-group [ex3500-ext-access-list|ex3500-std-access-list|mac-access-list]
  <ACL-NAME> in

no port monitor [ethernet|ex3500-ext-access-list|ex3500-std-access-list|
  mac-access-list|mac-address|vlan]

no port monitor ethernet 1 <1-52>

no port monitor [ex3500-ext-access-list|ex3500-std-access-list|mac-access-list]
  <ACL-NAME>

no port monitor mac-address <MAC>

no port monitor vlan <1-4094>

no power inline {maximum allocation|priority|time-range}

no shutdown

no speed-duplex

no switchport [l2protocol-tunnel [cdp|lldp|pvst+|spanning-tree|vtp]|native vlan]

no use ex3500-policy-map in

Parameters
  • no <PARAMETERS>

no <PARAMETERS> Removes or reverts the selected port’s settings based on the parameters passed

Examples

The following example shows the EX3524 profile's GE port 20's settings before the 'no' commands are executed:

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#show context
interface ge 1 20
  shutdown
  speed-duplex 100half
  switchport mode access
  use ex3500-policy-map in test
  power inline maximum allocation milliwatts 30000
  power inline priority critical
  power inline time-range EX3500_TimeRange_01
  access-group ex3500-ext-access-list EX3500_ACL_EXT_1 in time-range EX3500_TimeRange_01
  port monitor vlan 20

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#no shutdown

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#no power inline maximum allocation

nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#no use ex3500-policy-map in
The following example shows the EX3524 profile's GE port 20's settings after the 'no' commands are executed:

```
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#show context
interface ge 1 20
  speed-duplex 100half
  switchport mode access
  power inline maximum allocation milliwatts 32400
  power inline priority critical
  power inline time-range EX3500_TimeRange_01
  access-group ex3500-ext-access-list EX3500_ACL_EXT_1 in time-range EX3500_TimeRange_01
  port monitor vlan 20
nx9500-6C8809(config-profile-testEX3524-if-ge1-20)#
```
7.4.1.3 interface-vlan-config commands

The following table lists the VLAN interface configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip</td>
<td>Configures IP related settings for this VLAN interface</td>
<td>page 7-527</td>
</tr>
<tr>
<td>no</td>
<td>Removes the IP related settings configured for this VLAN interface</td>
<td>page 7-529</td>
</tr>
</tbody>
</table>
7.4.1.3.1 ip

Interface-vlan-config commands

Configures IP related settings for this VLAN interface

Supported in the following platforms:

- Switches — EX3524, EX3548
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

```
ip address [<IP/M>|bootp|dhcp]
ip address <IP/M> {default-gateway <IP>|secondary <IP>}
ip address [bootp|dhcp]
```

Parameters

- **ip address <IP/M> {default-gateway <IP>|secondary <IP>}**
  
  Manually configures the selected VLAN interface’s primary and secondary IPv4 addresses. It also allows to optionally configure the default gateway.
  
  - `<IP/M>` – Manually configures this VLAN interface’s IP address in the A.B.C.D/M format. Network mask for the associated IP subnet. This mask identifies the host address bits used for routing to specific subnets. The network mask can be either in the traditional format xxx.xxx.xxx.xxx or use classless format with the range /5 to /32. For example the subnet 255.255.224.0 would be /19.
  
  - `default-gateway <IP>` – Optional. Configures the default gateway’s IP address. This is the gateway through which this switch can reach other subnets not found in the local routing table. Before specifying the default gateway, ensure that the network interface directly connecting to the gateway is configured on the route. By default no gateway is specified.
  
  - `<IP>` – Specify the IP address in the A.B.C.D address.
  
  - `secondary <IP>` – Optional. Configures this VLAN interface’s secondary IP address
  
  - `<IP>` – Specify the secondary IP address in the A.B.C.D address

- **ip address [bootp|dhcp]**

  Enables a DHCP or Bootp server to provide the primary IPv4 address for the selected VLAN interface
  
  - `bootp` – Enables the VLAN interface to get its IP address from a Bootp server
  
  - `dhcp` – Enables the VLAN interface to get its IP address from a DHCP server

  If selecting DHCP/Bootp, ensure that a server on the network has been configured to provide the necessary configuration to the switch. Using DHCP or Bootp results in frequent connectivity loss between the browser interface and the switch. Further, DHCP and Bootp cannot configure secondary IP addresses needed for multinetting.
Examples

```bash
nx9500-6C8809(config-profile-testEX3524-if-vlan20)#ip address 192.168.13.28/24 default-gateway 192.168.13.13

nx9500-6C8809(config-profile-testEX3524-if-vlan20)#show context interface vlan 20
  ip address 192.168.13.28/24 default-gateway 192.168.13.13

nx9500-6C8809(config-profile-testEX3524-if-vlan20)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the IP address configured for this VLAN interface</td>
</tr>
</tbody>
</table>
7.4.1.3.2 no

interface-vlan-config commands

Removes the IP related settings configured for this VLAN interface

Supported in the following platforms:

- Switches — EX3524, EX3548
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

no ip address [<IP/M>|bootp|dhcp]

Parameters

- no <PARAMETERS>

Examples

The following example shows the interface VLAN 20 setting before the 'no' command is executed:

```
nx9500-6C8809(config-profile-testEX3524-if-vlan20)#show context
interface vlan 20
  ip address 192.168.13.28/24 default-gateway 192.168.13.13
nx9500-6C8809(config-profile-testEX3524-if-vlan20)#
```

```
nx9500-6C8809(config-profile-testEX3524-if-vlan20)#no ip address 192.168.13.28/24
```

The following example shows the interface VLAN 20 setting after the 'no' command is executed:

```
nx9500-6C8809(config-profile-testEX3524-if-vlan20)#show context
interface vlan 20
nx9500-6C8809(config-profile-testEX3524-if-vlan20)#
```
### 7.4.2 ip

#### EX3524 & EX3548 Profile/Device Config Commands

Configures the default gateway through which this EX35XX switch can reach other subnets

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

```plaintext
ip default-gateway <IP>
```

**Parameters**

- `ip default-gateway <IP>`

<table>
<thead>
<tr>
<th>ip default-gateway &lt;IP&gt;</th>
<th>Configures the default gateway's IP address in the A.B.C.D format</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP&gt;</td>
<td>• &lt;IP&gt; – Specify the IP address.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
nx9500-6C8809(config-profile-testEX3524)#ip default-gateway 192.168.13.13
```

```plaintext
nx9500-6C8809(config-profile-testEX3524)#show context profile ex3524 testEX3524
    ip default-gateway 192.168.13.13
no autoinstall configuration
no autoinstall firmware
interface ge 1 17
interface ge 1 16
interface ge 1 15
interface ge 1 14
interface ge 1 13
interface ge 1 12
interface ge 1 11
--More--
interface ge 1 21
use firewall-policy default
service pm sys-restart
nx9500-6C8809(config-profile-testEX3524)#
```
7.4.3 power

*EX3524 & EX3548 Profile/Device Config Commands*

Enables power inline compatibility mode on this EX35XX profile. This option is disabled by default.

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

```
power inline compatible
```

**Parameters**

- power inline compatible

**Examples**

```
nx9500-6C8809(config-profile-testEX3524)#power inline compatible

nx9500-6C8809(config-profile-testEX3524)#show context profile ex3524 testEX3524
  ip default-gateway 192.168.13.13
  power inline compatible
  no autoinstall configuration
  no autoinstall firmware
  interface ge 1 17
  interface ge 1 16
  interface ge 1 15
  interface ge 1 14
  interface ge 1 13
  interface ge 1 12
  --More--
nx9500-6C8809(config-profile-testEX3524)#
```
EX3524 & EX3548 Profile/Device Config Commands

Configures adopted EX35XX switch upgrade settings

For a EX35XX switch to adopt to and be managed by a WiNG controller, you need to upload two images on the switch. An operation code (opcode) image and an adopted image. The opcode image functions as an operating system that enables the WiNG controller to communicate with the EX35XX switch. This command allows you to configure the EX35XX’s opcode image upgrade settings.

Supported in the following platforms:
• Switches — EX3524, EX3548
• Wireless Controllers – RFS4000, RFS6000, RFS7000
• Service Platforms – NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax
upgrade opcode [auto|path <LINE>|reload]

Parameters
• upgrade opcode [auto|path <LINE>|reload]

<table>
<thead>
<tr>
<th>upgrade opcode</th>
<th>Configures the opcode image upgrade settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>auto</td>
<td>Enables automatic upgrade</td>
</tr>
<tr>
<td>path &lt;LINE&gt;</td>
<td>Configures the location of the opcode image</td>
</tr>
<tr>
<td>reload</td>
<td>Enables automatic reload after successful loading of the opcode image</td>
</tr>
</tbody>
</table>

Examples

```
x9500-6C8809(config-profile-testEX3524)#upgrade auto
nx9500-6C8809(config-profile-testEX3524)#upgrade reload
nx9500-6C8809(config-profile-testEX3524)#upgrade opcode path ftp://anonymous:anonymous@192.168.13.10/ex35xx/EX3524.img
```

```
x9500-6C8809(config-profile-testEX3524)#show context
profile ex3524 testEX3524
  ip default-gateway 192.168.13.13
  power inline compatible
  no autoinstall configuration
  no autoinstall firmware
  use firewall-policy default
  service pm sys-restart
upgrade opcode auto
upgrade opcode path  ftp://anonymous:anonymous@192.168.13.10/ex35xx/EX3524.img
upgrade opcode reload
```

```
x9500-6C8809(config-profile-testEX3524)#
```
7.4.5 use

- EX3524 & EX3548 Profile/Device Config Commands

Applies an EX3500 management policy to this EX35XX profile

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

Syntax

use ex3500-management-policy <POLICY-NAME>

Parameters

- use ex3500-management-policy <POLICY-NAME>

<table>
<thead>
<tr>
<th>use ex3500-management-policy &lt;POLICY-NAME&gt;</th>
<th>Applies an EX3500 management policy to this EX35XX profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;POLICY-NAME&gt; – Specify the EX3500 management policy name (should be existing and configured).</td>
<td></td>
</tr>
</tbody>
</table>

Examples

nx9500-6C8809(config-profile-testEX3524)#use ex3500-management-policy test
Trustpoints HTTPS Server and RSA keys for SSH can be configured with 'trustpoint' and 'rsa-key' commands in device context

nx9500-6C8809(config-profile-testEX3524)#

nx9500-6C8809(config-profile-testEX3524)#show context
profile ex3524 testEX3524
  ip default-gateway 192.168.13.13
  power inline compatible
  no autoinstall configuration
  no autoinstall firmware
  interface ge 1 17
  interface ge 1 16
  interface ge 1 15
  --More--

use ex3500-management-policy test
use firewall-policy default
service pm sys-restart
upgrade opcode auto
upgrade opcode path ftp://anonymous:anonymous@192.168.13.10/ex35xx/EX3524.img
upgrade opcode reload

nx9500-6C8809(config-profile-testEX3524)#
### 7.4.6 no

**EX3524 & EX3548 Profile/Device Config Commands**

Removes or reverts this EX3500 profile's settings

Supported in the following platforms:
- Switches — EX3524, EX3548
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX45XX, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9500, NX9510, NX9600

**Syntax**

```plaintext
no [interface vlan <1-4094>|default-gateway {<IP>}]|power inline compatible|upgrade opcode [auto|path|reload]|use ex3500-management-policy
```

**Parameters**
- no <PARAMETERS>

**Examples**

```plaintext
nx9500-6C8809(config-profile-testEX3524)#show context
profile ex3524 testEX3524
   ip default-gateway 192.168.13.13
   power inline compatible
   no autoinstall configuration
   no autoinstall firmware
   interface ge 1 17
   interface ge 1 16
   interface ge 1 15
   interface ge 1 14
   interface ge 1 13
   interface ge 1 12
   interface ge 1 11
   interface ge 1 10
   interface ge 1 24
   interface ge 1 22
   interface vlan 20
   interface ge 1 23
   --More--
   use ex3500-management-policy test
   use firewall-policy default
   service pm sys-restart
   upgrade opcode auto
   upgrade opcode path ftp://anonymous:anonymous@192.168.13.10/ex35xx/EX3524.img
   upgrade opcode reload

nx9500-6C8809(config-profile-testEX3524)#
```

```plaintext
nx9500-6C8809(config-profile-testEX3524)#no use ex3500-management-policy
nx9500-6C8809(config-profile-testEX3524)#no upgrade opcode reload
nx9500-6C8809(config-profile-testEX3524)#no interface vlan 20
```

```plaintext
nx9500-6C8809(config-profile-testEX3524)#show context
profile ex3524 testEX3524
   ip default-gateway 192.168.13.13
   power inline compatible
   no autoinstall configuration
   no autoinstall firmware
   interface ge 1 17
   interface ge 1 16
   interface ge 1 15
   interface ge 1 14
   interface ge 1 13
   interface ge 1 12
   interface ge 1 11
   interface ge 1 10
   interface ge 1 24
   interface ge 1 22
```

**Removes or reverts this EX3500 profile settings based on the parameters passed**
interface ge 1 24
interface ge 1 22
interface ge 1 23
--More--
use firewall-policy default
service pm sys-restart
upgrade opcode auto
upgrade opcode path ftp://anonymous:anonymous@192.168.13.10/ex35xx/EX3524.img
nx9500-6C8809(config-profile-testEX3524)#
This chapter summarizes the Authentication, Authorization, and Accounting (AAA) policy commands in the CLI command structure.

A AAA policy enables administrators to define access control settings governing network permissions. External RADIUS and LDAP servers (AAA servers) also provide user database information and user authentication data. Each WLAN maintains its own unique AAA configuration.

AAA provides a modular way of performing the following services:

**Authentication** — Provides a means for identifying users, including login and password dialog, challenge and response, messaging support and (depending on the security protocol), encryption. Authentication is the technique by which a user is identified before allowed access to the network. Configure AAA authentication by defining a list of authentication methods, and then applying the list to various interfaces. The list defines the authentication schemes performed and their sequence. The list must be applied to an interface before the defined authentication technique is conducted.

**Authorization** — Authorization occurs immediately after authentication. Authorization is a method for remote access control, including authorization for services and individual user accounts and profiles. Authorization functions through the assembly of attribute sets describing what the user is authorized to perform. These attributes are compared to information contained in a database for a given user and the result is returned to AAA to determine the user’s actual capabilities and restrictions. The database could be located locally or be hosted remotely on a RADIUS server. Remote RADIUS servers authorize users by associating attribute-value (AV) pairs with the appropriate user. Each authorization method must be defined through AAA. When AAA authorization is enabled it’s applied equally to all interfaces.

**Accounting** — Collects and sends security server information for billing, auditing, and reporting user data; such as start and stop times, executed commands (such as PPP), number of packets, and number of bytes. Accounting enables wireless network administrators to track the services users are accessing and the network resources they are consuming. When accounting is enabled, the network access server reports user activity to a RADIUS security server in the form of accounting records. Each accounting record is comprised of AV pairs and is stored locally on the access control server. The data can be analyzed for network management, client billing, and/or auditing. Accounting methods must be defined through AAA. When AAA accounting is activated, it is applied equally to all interfaces on the access servers.
Use the (config) instance to configure AAA policy commands. To navigate to the config-aaa-policy instance, use the following commands:

```
<DEVICE>(config)#aaa-policy <POLICY-NAME>
```

```
rfs7000-37FABE(config)#aaa-policy test
```

```
rfs7000-37FABE(config-aaa-policy-test)#?
```

### AAA Policy Mode commands:

- **accounting**: Configure accounting parameters
- **attribute**: Configure RADIUS attributes in access and accounting requests
- **authentication**: Configure authentication parameters
- **health-check**: Configure server health-check parameters
- **mac-address-format**: Configure the format in which the MAC address must be filled in the Radius-Request frames
- **no**: Negate a command or set its defaults
- **proxy-attribute**: Configure radius attribute behavior when proxying through controller or rf-domain-manager
- **server-pooling-mode**: Configure the method of selecting a server from the pool of configured AAA servers
- **use**: Set setting to use

```
rfs7000-37FABE(config-aaa-policy-test)#
```

---

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
## 8.1 aaa-policy

> **AAA-POLICY**

The following table summarizes AAA policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>accounting</td>
<td>Configures accounting parameters</td>
<td>page 8-4</td>
</tr>
<tr>
<td>attribute</td>
<td>Configure RADIUS attributes in access and accounting requests</td>
<td>page 8-8</td>
</tr>
<tr>
<td>authentication</td>
<td>Configures authentication parameters</td>
<td>page 8-11</td>
</tr>
<tr>
<td>health-check</td>
<td>Configures health check parameters</td>
<td>page 8-16</td>
</tr>
<tr>
<td>mac-address-format</td>
<td>Configures the MAC address format</td>
<td>page 8-17</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 8-18</td>
</tr>
<tr>
<td>proxy-attribute</td>
<td>Configures the RADIUS server’s attribute behavior when proxying through the wireless controller or the RF Domain manager</td>
<td>page 8-20</td>
</tr>
<tr>
<td>server-pooling-mode</td>
<td>Defines the method for selecting a server from the pool of configured AAA servers</td>
<td>page 8-21</td>
</tr>
<tr>
<td>use</td>
<td>Defines the AAA command settings</td>
<td>page 8-22</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see *Chapter 5, COMMON COMMANDS.*
8.1.1 accounting

aaa-policy

Configures the server type and interval at which interim accounting updates are sent to the server. A maximum of 6 accounting servers can be configured.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

accounting [interim|server|type]

accounting interim interval <60-3600>

accounting server [<1-6>|preference]

accounting server preference [auth-server-host|auth-server-number|none]

accounting server <1-6> [dscp|host|nai-routing|onboard|proxy-mode|retry-timeout-factor|timeout]

accounting server <1-6> [dscp <0-63>|retry-timeout-factor <50-200>]

accounting server <1-6> host <IP/HOSTNAME/HOST-ALIAS> secret [0 <SECRET>|2 <SECRET>]

accounting server <1-6> host <IP/HOSTNAME/HOST-ALIAS> secret [0 <SECRET>|2 <SECRET>]

accounting server <1-6> nai-routing realm-type [prefix|suffix] realm <REALM-TEXT>

accounting server <1-6> onboard [centralized-controller|self|controller]

accounting server <1-6> proxy-mode [none|through-centralized-controller|through-controller|through-mint-host <HOSTNAME/MINT-ID>|through-rf-domain-manager]

accounting server <1-6> timeout <1-60> {attempts <1-10>}

accounting type [start-interim-stop|start-stop|stop-only]

Parameters

- accounting interim interval <60-3600>

| interim | Configures the interim accounting interval. This is the interval at which interim accounting updates are posted to the accounting server. |
| interval <60-3600> | Specify the interim interval from 60 - 3600 seconds. The default is 1800 seconds. |

- accounting server preference [auth-server-host|auth-server-number|none]

| server | Configures a RADIUS accounting server’s settings |
| preference | Configures the accounting server’s preference mode. Authentication requests are forwarded to an accounting server from the pool, based on the preference mode selected. |
| auth-server-host | Sets the authentication server as the accounting server. This is the default setting. This parameter indicates the same server is used for authentication and accounting. The server is identified by its hostname. |
| auth-server-number | Sets the authentication server as the accounting server. This parameter indicates the same server is used for authentication and accounting. The server is identified by its index or number. |
| none | Indicates the accounting server is independent of the authentication server |
### accounting server <1-6> [dscp <0-63>|retry-timeout-factor <50-200>]

<table>
<thead>
<tr>
<th>server &lt;1-6&gt;</th>
<th>Configures an accounting server. Up to 6 accounting servers can be configured.</th>
</tr>
</thead>
</table>
| dscp <0-63>  | Sets the Differentiated Services Code Point (DSCP) value for Quality of Service (QOS) monitoring. This value is used in generated RADIUS packets.  
|              | • <0-63> – Sets the DSCP value from 0 - 63. The default value is 34. |
| retry-timeout-factor <50-200> | Sets the scaling factor for retransmission timeouts. The timeout at each attempt is a function of this retry-timeout factor and the attempt number.  
|              | • <50-200> – Specify a value from 50 - 200. The default is 100.  
|              | If the scaling factor is 100, the interval between two consecutive retries remains the same, irrespective of the number of retries.  
|              | If the scaling factor is less than 100, the interval between two consecutive retries reduces with subsequent retries.  
|              | If this scaling factor is greater than 100, the interval between two consecutive retries increases with subsequent retries. |

### server <1-6> [host <IP/HOSTNAME/HOST-ALIAS> secret [0 <SECRET>|2 <SECRET>|<SECRET>] {port <1-65535>}

<table>
<thead>
<tr>
<th>server &lt;1-6&gt;</th>
<th>Configures an accounting server. Up to 6 accounting servers can be configured.</th>
</tr>
</thead>
</table>
| host <IP/HOSTNAME/HOST-ALIAS> | Configures the accounting server’s hostname IP address, or host-alias  
| Note: The host alias should be existing and configured. |
| secret [0 <SECRET>|2 <SECRET>|<SECRET>] | Configures a common secret key used to authenticate with the accounting server  
| • 0 <SECRET> – Configures a clear text secret key  
| • 2 <SECRET> – Configures an encrypted secret key  
| • <SECRET> – Specify the secret key. This shared secret should not exceed 127 characters. |
| port <1-65535> | Optional. Configures the accounting server’s UDP port (the port used to connect to the accounting server)  
| • <1-65535> – Sets the port number from 1 - 65535 (default port is 1813) |

### server <1-6> nai-routing realm-type [prefix|suffix] realm <REALM-TEXT> {strip}

<table>
<thead>
<tr>
<th>server &lt;1-6&gt;</th>
<th>Configures an accounting server. Up to 6 accounting servers can be configured.</th>
</tr>
</thead>
</table>
| nai-routing | Enables Network Access Identifier (NAI) routing. This option is disabled by default.  
| The NAI is a character string in the format of an e-mail address as either user or user@ (it need not be a valid e-mail address or a fully qualified domain name (FQDN). The NAI can be used either in a specific or generic form. The specific form, which must contain the user portion and may contain the @ portion, identifies a single user. The generic form allows to be configured on a single command line. Each user still needs a unique security association, but these associations can be stored on a AAA server. The original purpose of NAI was to support roaming between dial up ISPs. Using NAI, each ISP need not have all the accounts for all of its roaming partners in a single RADIUS database. RADIUS servers can proxy requests to remote servers. |
| realm-type | Specifies whether the prefix or suffix of the username is used as the match criteria. For example, if the option selected is prefix, the username’s prefix is matched to the realm. |
### Accounting Server Configuration

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`[prefix</td>
<td>suffix]`</td>
</tr>
<tr>
<td></td>
<td>• prefix – Matches the prefix of the username (For example, username is of type DOMAIN/user1, DOMAIN/user2). This is the default setting.</td>
</tr>
<tr>
<td></td>
<td>• suffix – Matches the suffix of the username (For example, user1@DOMAIN, user2@DOMAIN)</td>
</tr>
<tr>
<td>realm <code>&lt;REALM-TEXT&gt;</code></td>
<td>Configures the text matched against the username. Enter the realm name (should not exceed 50 characters). When the RADIUS accounting server receives a request for a user name, the server references a table of user names. If the user name is known, the server proxies the request to the RADIUS server.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;REALM-TEXT&gt;</code> – Specifies the matching text including the delimiter (a delimiter is typically &quot; or '@')</td>
</tr>
<tr>
<td>strip</td>
<td>Optional. When enabled, strips the realm from the username before forwarding the request to the RADIUS server. This option is disabled by default.</td>
</tr>
</tbody>
</table>

- **accounting server <1-6> onboard [centralized-controller|self|controller]**

- **server <1-6>** Configures an accounting server. Up to 6 accounting servers can be configured.

- **onboard** Selects an onboard server instead of an external host

- **centralized-controller** Configures the server on the centralized controller managing the network

- **self** Configures the onboard server on a AP, wireless controller, or service platform (where the client is associated)

- **controller** Configures local RADIUS server settings

- **accounting server <1-6> proxy-mode [none|through-centralized-controller|through-controller|through-mint-host `<HOSTNAME/MINT-ID>`|through-rf-domain-manager]**

- **server <1-6>** Configures an accounting server. Up to 6 accounting servers can be configured.

- **proxy-mode** Select the mode used to proxy requests. The options are: none, through-controller, and through-rf-domain-manager.

- **none** No proxy required. Sends the request directly using the IP address of the device. This is the default setting.

- **through-centralized-controller** Proxy requests through the centralized controller that is configuring and managing the network

- **through-controller** Proxies requests through the controller (access point, wireless controller, or service platform) configuring the device

- **through-mint-host `<HOSTNAME/MINT-ID>`** Proxies requests through a neighboring MiNT device. Provide the device’s MiNT ID or hostname.

- **through-rf-domain-manager** Proxies requests through the local RF Domain Manager

- **accounting server <1-6> timeout <1-60> {attempts <1-10>**

- **server <1-6>** Configures an accounting server. Up to 6 accounting servers can be configured.
### accounting type [start-interim-stop|start-stop|stop-only]

<table>
<thead>
<tr>
<th>accounting type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>start-interim-stop</td>
<td>Sends accounting-start and accounting-stop messages when the session starts and stops. This parameter also sends interim accounting updates.</td>
</tr>
<tr>
<td>start-stop</td>
<td>Sends accounting-start and accounting-stop messages when the session starts and stops. This is the default setting.</td>
</tr>
<tr>
<td>stop-only</td>
<td>Sends an accounting-stop message when the session ends</td>
</tr>
</tbody>
</table>

#### Examples

```bash
rfs7000-37FABE(config-aaa-policy-test)#accounting interim interval 65
rfs7000-37FABE(config-aaa-policy-test)#accounting server 2 host 172.16.10.10 secret test1 port 1
rfs7000-37FABE(config-aaa-policy-test)#accounting server 2 timeout 2 attempts 2
rfs7000-37FABE(config-aaa-policy-test)#accounting type start-stop
rfs7000-37FABE(config-aaa-policy-test)#accounting server preference auth-server-number
rfs7000-37FABE(config-aaa-policy-test)#show context aaa-policy test
  accounting server 2 host 172.16.10.10 secret 0 test1 port 1
  accounting server 2 timeout 2 attempts 2
  accounting interim interval 65
  accounting server preference auth-server-number
rfs7000-37FABE(config-aaa-policy-test)#
```

#### Related Commands

- **no** Removes or resets accounting server parameters
8.1.2 attribute

`aaa-policy`

Configures RADIUS Framed-MTU attribute used in access and accounting requests. The Framed-MTU attribute reduces the Extensible Authentication Protocol (EAP) packet size of the RADIUS server. This command is useful in networks where routers and firewalls do not perform fragmentation.

To ensure network security, some firewall software drop UDP fragments from RADIUS server EAP packets. Consequently, the packets are large. Using Framed MTU reduces the packet size. EAP authentication uses Framed MTU to notify the RADIUS server about the Maximum Transmission Unit (MTU) negotiation with the client. The RADIUS server communications with the client do not include EAP messages that cannot be delivered over the network.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
attribute [acct-delay-time|acct-multi-session-id|chargeable-user-identity|cisco-vsa|framed-ip-address|framed-mtu<location-information|nas-ipv6-address|operator-name|service-type]

attribute acct-delay-time
attribute acct-multi-session-id
attribute chargeable-user-identity
attribute cisco-vsa audit-session-id
attribute framed-ip-address
attribute framed-mtu <100-1500>
attribute location-information [include-always|none|server-requested]
attribute nas-ipv6-address
attribute operator-name <OPERATOR-NAME>
attribute service-type [framed|login]
```

Parameters

- `attribute acct-delay-time`

  Enables support for `accounting-delay-time` attribute in accounting requests. When enabled, this attribute indicates the number of seconds the client has been trying to send a request to the accounting server. By subtracting this value from the time the packet is received by the server, the system is able to calculate the time of a request-generating event. Note, the network transit time is ignored. This option is disabled by default.

  **Note:** Including the `acct-delay-time` attribute in accounting requests updates the acct-delay-time value whenever the packet is retransmitted. This changes the content of the attributes field, requiring a new identifier and request authenticator.

- `attribute acct-multi-session-id`

  Enables support for `accounting-multi-session-id` attribute. When enabled, it allows linking of multiple related sessions of a roaming client. This option is useful in scenarios where a client roaming between access points sends multiple RADIUS accounting requests to different access points. This option is disabled by default.
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>attribute chargeable-user-identity</strong></td>
<td>Enables support for chargeable-user-identity attribute. This option is disabled by default.</td>
</tr>
<tr>
<td><strong>attribute cisco-vsa audit-session-id</strong></td>
<td>Configures the CISCO Vendor Specific Attribute (VSA) attribute included in access requests. This feature is disabled by default. This VSA allows CISCO’s Identity Services Engine (ISE) to validate a requesting client’s network compliance, such as the validity of virus definition files (antivirus software or definition files for an anti-spyware software application).</td>
</tr>
<tr>
<td></td>
<td>• audit-session-id – Includes the audit session ID attribute in access requests</td>
</tr>
<tr>
<td></td>
<td>Note: The audit session ID is included in access requests when Cisco ISE is configured as an authentication server.</td>
</tr>
<tr>
<td></td>
<td>Note: If the Cisco VSA attribute is enabled, configure an additional UDP port to listen for dynamic authorization messages from the Cisco ISE server. For more information, see <a href="#">service</a>.</td>
</tr>
<tr>
<td><strong>attribute framed-ip-address</strong></td>
<td>Enables inclusion of framed IP address attribute in access requests. This option is disabled by default.</td>
</tr>
<tr>
<td><strong>attribute framed-mtu &lt;100-1500&gt;</strong></td>
<td>Configures Framed-MTU attribute used in access requests</td>
</tr>
<tr>
<td></td>
<td>• &lt;100-1500&gt; – Specify the Framed-MTU attribute from 100 - 1500. The default value is 1400.</td>
</tr>
<tr>
<td>**attribute location-information [include-always</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>• include-always – Always includes location information in RADIUS authentication and accounting messages</td>
</tr>
<tr>
<td></td>
<td>• none – Disables sending of location information in RADIUS authentication and accounting messages. This is the default setting.</td>
</tr>
<tr>
<td></td>
<td>• server-requested – Includes location information in RADIUS authentication and accounting messages only when requested by the server</td>
</tr>
<tr>
<td></td>
<td>Note: When enabled, location information is exchanged in authentication and accounting messages.</td>
</tr>
<tr>
<td><strong>attribute nas-ipv6-address</strong></td>
<td>Enables support for NAS IPv6 address. This option is disabled by default. When enabled, IPv6 addresses are assigned to hosts. The length of IPv4 and IPv6 addresses is 32-bit and 128-bit respectively. Consequently, an IPv6 address requires a larger address space.</td>
</tr>
</tbody>
</table>
## operator-name <OPERATOR-NAME>

Enables support for RFC5580 operator name attribute. When enabled, the network operator’s name is included in all RADIUS authentication and accounting messages and uniquely identifies the access network owner. This option is disabled by default.
- `<OPERATOR-NAME>` – Specify the network operator’s name (should not exceed 63 characters in length).

## service-type [framed|login]

Configures the service-type (6) attribute value. This attribute identifies the following: the type of service requested and the type of service to be provided.
- `framed` – Sets service-type to `framed (2)` in the authentication packets. When enabled, a framed protocol, *Point-to-Point Protocol (PPP)* or *Serial Line Internet Protocol (SLIP)*, is started for the client. This is the default setting.
- `login` – Sets service-type to `login (1)` in the authentication packets. When enabled, the client is connected to the host.

### Examples

```bash
rfs7000-37FABE(config-aaa-policy-test)#attribute framed-mtu 110
rfs7000-37FABE(config-aaa-policy-test)#show context
    aaa-policy test
      accounting server 2 host 172.16.10.10 secret 0 test1 port 1
      accounting server 2 timeout 2 attempts 2
      accounting interim interval 65
      accounting server preference auth-server-number
      attribute framed-mtu 110
rfs7000-37FABE(config-aaa-policy-test)#

rfs7000-37FABE(config-aaa-policy-test1)#attribute cisco-vsa audit-session-id
rfs7000-37FABE(config-aaa-policy-test1)#show context
    aaa-policy test
      attribute cisco-vsa audit-session-id
rfs7000-37FABE(config-aaa-policy-test1)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets values or disables commands</td>
</tr>
</tbody>
</table>
8.1.3 authentication

aaa-policy

Configures user authentication parameters

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RF5400, RF6300, RF6700
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

authentication [eap|protocol|server]

authentication eap wireless-client [attempts <1-10>|identity-request-retry-timeout <10-5000>|identity-request-timeout <1-60>|retry-timeout-factor <50-200>|timeout <1-60>]

authentication protocol [chap|mschap|mschapv2|pap]

authentication server <1-6> [dscp|host|nac|nai-routing|onboard|proxy-mode]
    retry-timeout-factor[timeout]

authentication server <1-6> dscp <0-63>
authentication server <1-6> host <IP/HOSTNAME/HOST-ALIAS> secret [0 <SECRET>|2 <SECRET>]
    {port <1-65535>}
authentication server <1-6> nac
authentication server <1-6> nai-routing realm-type [prefix|suffix] realm <REALM-NAME>
    {strip}
authentication server <1-6> onboard [centralized-controller|controller|self]
    through-controller|through-mint-host <HOSTNAME/MINT-ID>|through-rf-domain-manager
authentication server <1-6> retry-timeout-factor <50-200>
authentication server <1-6> timeout <1-60> {attempts <1-10>}

Parameters


| eap          | wireless-client
|--------------|----------------|
| attempts     | Configures wireless client’s EAP parameters
| <1-10>       | Configures the maximum number of attempts allowed to authenticate a wireless client
|              | • <1-10> – Specify a value from 1 - 10. The default is 3.
| identity-request-timeout | Configures the interval, in milliseconds, after which an EAP-identity request to the wireless client is retried
| <10-5000>    | • <10-5000> – Specify a value from 10 - 5000 milliseconds. The default is 1000 milliseconds.
| identity-request-timeout | Configures the timeout, in seconds, after the last EAP-identity request message retry attempt (to allow time to manually enter user credentials)
| <1-60>       | • <1-60> – Specify a value from 1 - 60 seconds. The default is 30 seconds.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| retry-timeout-factor <50-200> | Configures the spacing between successive EAP retries  
- `<50-200>` – Specify a value from 50 - 200. The default is 100.  
A value of 100 indicates the interval between two consecutive retries remains the same irrespective of the number of retries.  
A value lesser than 100 indicates the interval between two consecutive retries reduces with each successive retry.  
A value greater than 100 indicates the interval between two consecutive retries increases with each successive retry. |
| timeout <1-60>          | Configures the interval, in seconds, between successive EAP-identity request sent to a wireless client  
- `<1-60>` – Specify a value from 1 - 60 seconds. The default is 3 seconds.                                                                                                                                                                                                      |
| protocol [chap|mschap|mschapv2|pap]               | Configures one of the following protocols for non-EAP authentication:  
- `chap` – Uses Challenge Handshake Authentication Protocol (CHAP)  
- `mschap` – Uses Microsoft Challenge Handshake Authentication Protocol (MS-CHAP)  
- `mschapv2` – Uses MS-CHAP version 2  
- `pap` – Uses Password Authentication Protocol (PAP) (default authentication protocol used)                                                                                                                                                                     |
| server <1-6>            | Configures a RADIUS authentication server. Up to 6 RADIUS servers can be configured.  
- `<1-6>` – Specify the RADIUS server index from 1 - 6.                                                                                                                                                                                                                       |
| dscp <0-63>             | Configures the Differentiated Service Code Point (DSCP) quality of service parameter generated in RADIUS packets. The DSCP value specifies the class of service provided to a packet, and is represented by a 6-bit parameter in the header of every IP packet.  
- `<0-63>` – Specify the value from 0 - 63. The default is 46.                                                                                                                                                  |
| server <1-6>            | Configures a RADIUS authentication server. Up to 6 RADIUS servers can be configured.  
- `<1-6>` – Specify the RADIUS server index from 1 - 6.                                                                                                                                                                                                                       |
| host <IP/HOSTNAME/HOST-ALIAS> | Sets the RADIUS authentication server’s IP address, hostname, or host-alias  
**Note:** The host alias should be existing and configured.                                                                                           |
| secret [0 <SECRET>|2 <SECRET>|<SECRET>] | Configures the RADIUS authentication server’s secret. This key is used to authenticate with the RADIUS server.  
- `0 <SECRET>` – Configures a clear text secret  
- `2 <SECRET>` – Configures an encrypted secret  
- `<SECRET>` – Specify the secret key. The shared key should not exceed 127 characters in length.                                                                                                               |
| port <1-65535>          | Optional. Specifies the RADIUS authentication server’s UDP port (this port is used to connect to the RADIUS server)  
- `<1-65535>` – Specify a value from 1 - 65535. The default port is 1812.                                                                                                                                       |
### authentication server <1-6> nac

<table>
<thead>
<tr>
<th>server &lt;1-6&gt;</th>
<th>Configures a RADIUS authentication server. Up to 6 RADIUS servers can be configured.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>&lt;1-6&gt;</strong> – Specify the RADIUS server index from 1 - 6.</td>
</tr>
</tbody>
</table>

**nac** Enables *Network Access Control (NAC)* on the RADIUS authentication server identified by the **<1-6>** parameter.

Using NAC, the controller hardware and software grant access to specific network resources. NAC performs a user and client authorization check for resources that do not have a NAC agent. NAC verifies the client’s compliance with the controller’s security policy. The controller supports only the EAP/802.1x type of NAC. However, the controller also provides a means to bypass NAC authentication for client’s that do not have NAC 802.1x support (printers, phones, PDAs, etc.).

### accounting server <1-6> nai-routing realm-type [prefix|suffix] realm <REALM-NAME>

<table>
<thead>
<tr>
<th>server &lt;1-6&gt;</th>
<th>Configures a RADIUS authentication server. Up to 6 RADIUS servers can be configured.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>&lt;1-6&gt;</strong> – Specifies the RADIUS server index from 1 - 6.</td>
</tr>
</tbody>
</table>

**nai-routing** Enables NAI routing. When enabled, AAA servers identify clients using NAI. This option is disabled by default.

The NAI is a character string in the format of an e-mail address as either user or user@ but it need not be a valid e-mail address or a fully qualified domain name. The NAI can be used either in a specific or generic form. The specific form, which must contain the user portion and may contain the @ portion, identifies a single user. The generic form allows all users in a given or without a to be configured on a single command line. Each user still needs a unique security association, but these associations can be stored on a AAA server. The original purpose of the NAI was to support roaming between dial up ISPs. Using NAI, each ISP need not have all the accounts for all of its roaming partners in a single RADIUS database. RADIUS servers can proxy requests to remote servers for each.

**realm-type**

- **prefix** – Sets the realm prefix. For example, in the realm name ‘AC\JohnTalbot’, the prefix is ‘AC’ and the user name ‘JohnTalbot’.
- **suffix** – Sets the realm suffix. For example, in the realm name ‘JohnTalbot@AC.org’ the suffix is ‘AC.org’ and the user name is ‘JohnTalbot’.

<table>
<thead>
<tr>
<th>realm &lt;REALM-NAME&gt;</th>
<th>Sets the realm information used for RADIUS authentication. The realm name should not exceed 64 characters in length. When the wireless controller or access point’s RADIUS server receives a request for a user name the server references a table of usernames. If the user name is known, the server proxies the request to the RADIUS server.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>&lt;REALM-NAME&gt;</strong> – Sets the realm used for authentication. This value is matched against the user name provided for RADIUS authentication.</td>
</tr>
</tbody>
</table>

Example:

- Prefix - AC\JohnTalbot
- Suffix - JohnTalbot@AC.org
<table>
<thead>
<tr>
<th>strip</th>
<th>Optional. Indicates the realm name must be stripped from the user name before sending it to the RADIUS server for authentication. For example, if the complete username is 'AC\JohnTalbot', then with the strip parameter enabled, only the 'JohnTalbot' part of the complete username is sent for authentication. This option is disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>authentication server &lt;1-6&gt; onboard [centralized-controller</td>
<td>controller</td>
</tr>
<tr>
<td>server &lt;1-6&gt;</td>
<td>Configures a RADIUS authentication server. Up to 6 RADIUS servers can be configured.</td>
</tr>
<tr>
<td>&lt;1-6&gt; – Specify the RADIUS server index from 1 - 6.</td>
<td></td>
</tr>
<tr>
<td>onboard [centralized-controller</td>
<td>controller</td>
</tr>
<tr>
<td>through-centralized-controller – Configures the server on the centralized controller managing the network</td>
<td></td>
</tr>
<tr>
<td>controller – Configures the wireless controller, to which the AP is adopted, as the onboard wireless controller</td>
<td></td>
</tr>
<tr>
<td>self – Configures the onboard server on the device (AP or wireless controller) where the client is associated as the onboard wireless controller</td>
<td></td>
</tr>
<tr>
<td>proxy-mode [none</td>
<td>through-centralized-controller</td>
</tr>
<tr>
<td>none – Proxying is not done. The packets are sent directly using the IP address of the device. This is the default setting.</td>
<td></td>
</tr>
<tr>
<td>through-centralized-controller – Traffic is proxied through the centralized controller that is configuring and managing the network.</td>
<td></td>
</tr>
<tr>
<td>through-controller – Traffic is proxied through the wireless controller configuring this device.</td>
<td></td>
</tr>
<tr>
<td>through-mint-host &lt;HOSTNAME/MINT-ID&gt; – Traffic is proxied through a neighboring MiNT device. Provide the device’s hostname or MiNT ID.</td>
<td></td>
</tr>
<tr>
<td>through-rf-domain-manager – Traffic is proxied through the local RF Domain manager.</td>
<td></td>
</tr>
<tr>
<td>retry-timeout-factor &lt;50-200&gt;</td>
<td>Configures the scaling of timeouts between two consecutive RADIUS authentication retries</td>
</tr>
<tr>
<td>&lt;50-200&gt; – Specify the scaling factor from 50 - 200. The default is 100.</td>
<td></td>
</tr>
<tr>
<td>A value of 100 indicates the interval between two consecutive retires remains the same irrespective of the number of retries.</td>
<td></td>
</tr>
<tr>
<td>A value lesser than 100 indicates the interval between two consecutive retires reduces with each successive retry.</td>
<td></td>
</tr>
<tr>
<td>A value greater than 100 indicates the interval between two consecutive retires increases with each successive retry.</td>
<td></td>
</tr>
</tbody>
</table>
- `authentication server <1-6>`
  - `timeout <1-60>`
    - `{attempts <1-10>}`

| server | Configures a RADIUS authentication server. Up to 6 RADIUS servers can be configured.  
  |        |  
  |        | • `<1-6>` – Specify the RADIUS server index from 1 - 6.  
| timeout | Configures the timeout, in seconds, for each request sent to the RADIUS server. This is the time allowed to elapse before another request is sent to the RADIUS server. If a response is received from the RADIUS server within this time, no retry is attempted.  
  |        |  
  |        | • `<1-60>` – Specify a value from 1 - 60 seconds. The default is 3 seconds.  
| attempts | Optional. Indicates the number of retry attempts to make before giving up  
  |        |  
  |        | • `<1-10>` – Specify a value from 1 -10. The default is 3.  

**Examples**

```plaintext
rfs7000-37FABE(config-aaa-policy-test)#authentication server 5 host 172.16.10.10 secret 0 test1 port 1
rfs7000-37FABE(config-aaa-policy-test)#authentication server 5 timeout 10 attempts 3
rfs7000-37FABE(config-aaa-policy-test)#authentication protocol chap
```

```plaintext
rfs7000-37FABE(config-aaa-policy-test)#show context
aaa-policy test
  authentication server 5 host 172.16.10.10 secret 0 test1 port 1
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 test1 port 1
  accounting server 2 timeout 2 attempts 2
  authentication protocol chap
  accounting interim interval 65
  accounting server preference auth-server-number
  attribute framed-mtu 110
rfs7000-37FABE(config-aaa-policy-test)#
```

**Related Commands**

| no | Resets authentication parameters on this AAA policy |
8.1.4 health-check

An AAA server could go offline. When a server goes offline, it is marked as *down*. This command configures the interval after which a server marked as *down* is checked to see if it has come back online and is reachable.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
health-check interval <60-86400>
```

**Parameters**

- `health-check interval <60-86400>`

**Examples**

```
rfs7000-37FABE(config-aaa-policy-test)#health-check interval 4000
```

```
rfs7000-37FABE(config-aaa-policy-test)#show context
aaa-policy test
  authentication server 5 host 172.16.10.10 secret 0 test1 port 1
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 test1 port 1
  accounting server 2 timeout 2 attempts 2
  authentication protocol chap
  accounting interim interval 65
  accounting server preference auth-server-number
  health-check interval 4000
  attribute framed-mtu 110
rfs7000-37FABE(config-aaa-policy-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets the health-check interval for AAA servers</td>
</tr>
</tbody>
</table>
8.1.5 **mac-address-format**

`aaa-policy`

Configures the format MAC addresses are filled in RADIUS request frames

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
mac-address-format [middle-hyphen|no-delim|pair-colon|pair-hyphen|quad-dot]
mac-address-format [middle-hyphen|no-delim|pair-colon|pair-hyphen|quad-dot]
    case [lower|upper] attributes [all|username-password]
```

**Parameters**

- `mac-address-format [middle-hyphen|no-delim|pair-colon|pair-hyphen|quad-dot]`
- `case [lower|upper] attributes [all|username-password]`

<table>
<thead>
<tr>
<th>middle-hyphen</th>
<th>Configures the MAC address format as AABBCC-DDEEFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>no-delim</td>
<td>Configures the MAC address format as AABBCCDDEEFF (without delimiters)</td>
</tr>
<tr>
<td>pair-colon</td>
<td>Configures the MAC address format as AA:BB:CC:DD:EE:FF</td>
</tr>
<tr>
<td>pair-hyphen</td>
<td>Configures the MAC address display format as AA-BB-CC-DD-EE-FF (default setting)</td>
</tr>
<tr>
<td>quad-dot</td>
<td>Configures the MAC address display format as AABB.CCDD.EEFF</td>
</tr>
<tr>
<td>case [lower</td>
<td>upper] attributes [all</td>
</tr>
<tr>
<td></td>
<td>- lower – Indicates MAC address is in lower case. For example, aa:bb:cc:dd:ee:ff</td>
</tr>
<tr>
<td></td>
<td>- upper – Indicates MAC address is in upper case. For example, AA:BB:CC:DD:EE:FF (default setting)</td>
</tr>
<tr>
<td>attributes [all</td>
<td>username-password]</td>
</tr>
<tr>
<td></td>
<td>- all – Applies to all attributes with MAC addresses such as username, password, calling-station-id, and called-station-id</td>
</tr>
<tr>
<td></td>
<td>- username-password – Applies only to the username and password fields (default setting)</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-aaa-policy-test)#mac-address-format quad-dot case upper attributes username-password

rfs7000-37FABE(config-aaa-policy-test)#show context
aaa-policy test
    authentication server 5 host 172.16.10.10 secret 0 test1 port 1
    authentication server 5 timeout 10
    accounting server 2 host 172.16.10.10 secret 0 test1 port 1
    accounting server 2 timeout 2 attempts 2
    mac-address-format quad-dot case upper attributes username-password
    authentication protocol chap
    -- More --

rfs7000-37FABE(config-aaa-policy-test)#
```

**Related Commands**

| no | Resets the MAC address format to default (pair-hyphen) |
8.1.6 no

Negates a AAA policy command or sets its default

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [accounting|attribute|authentication|health-check|mac-address-format|
proxy-attribute|server-pooling-mode|use]

no accounting interim interval
no accounting server preference
no accounting server <1-6> {dscp|nai-routing|proxy-mode|retry-timeout-factor|timeout}
no accounting type

no attribute [acct-delay-time|acct-multi-session-id|chargeable-user-identity|
cisco-vsa audit-session-id|framed-ip-address|framed-mtu|location-information|
nas-ipv6-address|operator-name|service-type]

no authentication [eap|protocol|server]
no authentication eap wireless-client [attempts|identity-request-retry-timeout|
identity-request-timeout|retry-timeout-factor|timeout]
no authentication protocol
no authentication server <1-6> {dscp|nac|nai-routing|proxy-mode|retry-timeout-factor|
timeout}

no health-check interval
no mac-address-format
no proxy-attribute [nas-identifier|nas-ip-address]
no server-pooling-mode
no use nac-list

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Negates a AAA policy command or sets its default |

Examples

The following example shows the AAA policy ‘test’ settings before the ‘no’ commands are executed:

```
rfs7000-37FABE(config-aaa-policy-test)#show context
aaa-policy test
  authentication server 5 host 172.16.10.10 secret 0 test1 port 1
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 test1 port 1
  accounting server 2 timeout 2 attempts 2
  mac-address-format quad-dot case upper attributes username-password
  authentication protocol chap
  accounting interim interval 65
  accounting server preference auth-server-number
  health-check interval 4000
  attribute framed-mtu 110
rfs7000-37FABE(config-aaa-policy-test)#
```
AAA-POLICY 8-19

rfs7000-37FABE(config-aaa-policy-test)#no accounting server 2 timeout 2
rfs7000-37FABE(config-aaa-policy-test)#no accounting interim interval
rfs7000-37FABE(config-aaa-policy-test)#no health-check interval
rfs7000-37FABE(config-aaa-policy-test)#no attribute framed-mtu
rfs7000-37FABE(config-aaa-policy-test)#no authentication protocol

The following example shows the AAA policy 'test' settings after the 'no' commands are executed:

rfs7000-37FABE(config-aaa-policy-test)#show context
aaa-policy test
  authentication server 5 host 172.16.10.10 secret 0 test1 port 1
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 test1 port 1
  accounting server preference auth-server-number
  mac-address-format quad-dot case upper attributes username-password
  health-check interval 4000
rfs7000-37FABE(config-aaa-policy-test)#
8.1.7 `proxy-attribute`

aaa-policy

Configures RADIUS server’s attribute behavior when proxying through a wireless controller or a RF Domain manager.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
proxy-attribute [nas-identifier|nas-ip-address]
proxy-attribute [nas-identifier [originator|proxier]|nas-ip-address [none|proxier]]
```

**Parameters**

- `proxy-attribute [nas-identifier [originator|proxier]|nas-ip-address [none|proxier]]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nas-identifier</td>
<td>Uses NAS identifier</td>
</tr>
<tr>
<td>[originator</td>
<td>proxier]</td>
</tr>
<tr>
<td></td>
<td>• proxier – Configures the proxying device as the NAS identifier. The device could be a controller or a RF Domain manager.</td>
</tr>
<tr>
<td>nas-ip-address</td>
<td>Uses NAS IP address</td>
</tr>
<tr>
<td>[none</td>
<td>proxier]</td>
</tr>
<tr>
<td></td>
<td>• proxier – NAS IP address is filled by the proxying device. The device could be a controller or a RF Domain manager. This is the default setting.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-aaa-policy-test)#proxy-attribute nas-ip-address proxier
rfs7000-37FABE(config-aaa-policy-test)#proxy-attribute nas-identifier originator
```

**Related Commands**

- `no` Resets RADIUS server’s proxying attributes
8.1.8 server-pooling-mode

Configures the server selection method from a pool of AAA servers. The available methods are *failover* and *load-balance*.

In the failover scenario, when a configured AAA server goes down, the server with the next higher index takes over for the failed server.

In the load-balance scenario, when a configured AAA server goes down, the remaining servers distribute the load amongst themselves.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
server-pooling-mode [failover|load-balance]
```

**Parameters**

- `server-pooling-mode [failover|load-balance]`

<table>
<thead>
<tr>
<th>failover</th>
<th>Sets the pooling mode to failover. This is the default setting. When a configured AAA server fails, the server with the next higher index takes over the failed server’s load.</th>
</tr>
</thead>
<tbody>
<tr>
<td>load-balance</td>
<td>Sets the pooling mode to load balancing. When a configured AAA server fails, all servers in the pool share the failed server’s load transmitting requests in a round-robin fashion.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-aaa-policy-test)#server-pooling-mode load-balance
rfs7000-37FABE(config-aaa-policy-test)#show context
    aaa-policy test
        authentication server 5 host 172.16.10.10 secret 0 test2 port 1
        authentication server 5 timeout 10
        accounting server 2 host 172.16.10.10 secret 0 test1 port 1
        server-pooling-mode load-balance
        mac-address-format quad-dot case upper attributes username-password
        accounting server preference auth-server-number
        health-check interval 4000
rfs7000-37FABE(config-aaa-policy-test)#
```

**Related Commands**

- `no` Resets the method of selecting a server, from the pool of configured AAA servers
8.1.9 use

Use aaa-policy

Associates a Network Access Control (NAC) with this AAA policy. This allows only the set of configured devices to use the configured AAA servers.

For more information on creating a NAC list, see nac-list.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

use nac-list <NAC-LIST-NAME>

Parameters

- use nac-list <NAC-LIST-NAME>

<table>
<thead>
<tr>
<th>nac-list</th>
<th>&lt;NAC-LIST-NAME&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associates a NAC list with this AAA policy</td>
<td></td>
</tr>
<tr>
<td>• &lt;NAC-LIST-NAME&gt; – Specify the NAC list name (should be existing and configured).</td>
<td></td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-aaa-policy-test)#use nac-list test1

rfs7000-37FABE(config-aaa-policy-test)#show context

aaa-policy test
  authentication server 5 host 172.16.10.10 secret 0 test1 port 1
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 test1 port 1
  server-pooling-mode load-balance
  mac-address-format quad-dot case upper attributes username-password
  accounting server preference auth-server-number
  health-check interval 4000

use nac-list test1
rfs7000-37FABE(config-aaa-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>no</th>
<th>Resets set values or disables commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>nac-list</td>
<td>Creates a NAC list</td>
</tr>
</tbody>
</table>
CHAPTER 9
AUTO-PROVISIONING-POLICY

This chapter summarizes the auto provisioning policy commands in the CLI command structure.

Wireless devices can adopt and manage other wireless devices. For example, a wireless controller can adopt multiple access points. When a device is adopted, the device configuration is provisioned by the adopting device. Since multiple configuration policies are supported, an adopting device uses auto provisioning policies to determine which configuration policies are applied to an adoptee based on its properties. For example, a configuration policy could be assigned based on MAC address, IP address, CDP snoop strings, etc.

Auto provisioning or adoption is the process by which an access point discovers controllers in the network, identifies the most desirable controller, associates with the identified controller, and optionally obtains an image upgrade, obtains its configuration and considers itself provisioned.

At adoption, an access point solicits and receives multiple adoption responses from controllers available on the network. These adoption responses contain loading policy information the access point uses to select the optimum controller for adoption. An auto-provisioning policy maps a new AP to a profile and RF Domain based on various parameters related to the AP and where it is connected. By default a new AP will be mapped to the default profile and default RF Domain. Modify existing auto-provisioning policies or create a new one as needed to meet the configuration requirements of a device.

An auto-provisioning policy enables an administrator to define rules for the supported access points capable of being adopted by a controller. The policy determines which configuration policies are applied to an adoptee based on its properties. For example, a configuration policy could be assigned based on MAC address, IP address, CISCO Discovery Protocol (CDP) snoop strings, etc. Once created an auto provisioning policy can be used in profiles or device configuration objects. The policy contains a set of rules (ordered by precedence) that either deny or allow adoption based on potential adoptee properties and a catch-all variable that determines if the adoption should be allowed when none of the rules is matched. All rules (both deny and allow) are evaluated sequentially starting with the rule with the lowest precedence. The evaluation stops as soon as a rule has been matched, no attempt is made to find a better match further down in the set.

For example,

```
rule #1 adopt ap7131 10 profile default vlan 10
rule #2 adopt ap650 20 profile default vlan 20
rule #3 adopt ap7131 30 profile default serial-number
rule #4 adopt ap7131 40 p d mac aa bb
```

AP7131 L2 adoption, VLAN 10 - will use rule #1
AP7131 L2 adoption, VLAN 20 - will not use rule #2 (wrong type), may use rule #3 if the serial number matched, or rule #4
If aa<= MAC <= bb, or else default.

With the implementation of the hierarchically managed (HM) network, the auto-provisioning policy has been modified to enable controllers to adopt other controllers in addition to access points.
The new WiNG HM network defines a three-tier structure, consisting of multiple wireless sites managed by a single Network Operations Center (NOC) controller. The NOC controller constitutes the first and the site controllers constitute the second tier of the hierarchy. The site controllers in turn adopt and manage access points that form the third tier of the hierarchy.

All adopted devices (access points and second-level controllers) are referred to as the ‘adoptee’. The adopting devices are the ‘adopters’.

A controller cannot be configured as an adoptee and a controller adopter simultaneously. In other words, a controller can either be an adopter (adopts another controller) or an adoptee (is adopted by another controller). Therefore, a site controller, which has been adopted by a NOC controller, cannot adopt another controller. But it can adopt access points. For more information on HM network, see device-upgrade.

A controller should be configured to specify the device types (APs and/or controllers) that it can adopt. For more information on configuring the adopted-device types for a controller, see service.

**NOTE:** The adoption capabilities of a controller depends on:

- Whether the controller is deployed at the NOC or site
- A NOC controller can adopt site controllers and access points
- A site controller can adopt access points only
- The controller device type, which determines the number and type of devices it can adopt

The NOC controller can adopt a site controller with a capacity equal to or lower than its own. The following table displays the NOC controllers and the corresponding site-level controllers supported by each:

<table>
<thead>
<tr>
<th>Site Controllers supported by each NOC controller</th>
<th>NOC Controllers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RFS7000</td>
</tr>
<tr>
<td>RFS4000</td>
<td>X</td>
</tr>
<tr>
<td>RFS6000</td>
<td>X</td>
</tr>
<tr>
<td>RFS7000</td>
<td>X</td>
</tr>
<tr>
<td>NX45XX</td>
<td>-</td>
</tr>
<tr>
<td>NX65XX</td>
<td>-</td>
</tr>
<tr>
<td>NX7500</td>
<td>-</td>
</tr>
<tr>
<td>NX9000</td>
<td>-</td>
</tr>
<tr>
<td>NX95XX</td>
<td>-</td>
</tr>
</tbody>
</table>

**NOTE:** Some access points can be configured as virtual controllers. When configured as a virtual controller, an AP can only adopt another AP of the same type. In such a scenario, an auto provisioning policy is required to enable adoption of a specific device identified by its MAC address, IP address, serial number, model number, etc.
Use the (config) instance to configure an auto-provisioning policy. To navigate to the auto-provisioning-policy configuration instance, use the following command:

<DEVICE>(config)#auto-provisioning-policy <POLICY-NAME>

rfs7000-37FABE(config)#auto-provisioning-policy test
rfs7000-37FABE(config-auto-provisioning-policy-test)#?

Auto-Provisioning Policy Mode commands:

adopt Add rule for device adoption
clear-create-rfd-template When RF Domain specified by the matching rule template does not exist create new RF Domain automatically
default-adoption Adopt devices even when no matching rules are found. Assign default profile and default rf-domain
deny Add rule to deny device adoption
evaluate-always Set the flag to evaluate the policy everytime, regardless of previous adoption status
no Negate a command or set its defaults
redirect Add rule to redirect device adoption
upgrade Add rule for device upgrade
clearclscr Clears the display screen
docommit Commit all changes made in this session
do Run commands from Exec mode
deexite End current mode and change to EXEC mode
helpDescription of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
writewrite Running configuration to memory or terminal

rfs7000-37FABE(config-auto-provisioning-policy-test)#

**NOTE:** The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
## 9.1 auto-provisioning-policy

The following table summarizes auto provisioning policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>adopt</td>
<td>Adds a permit adoption rule</td>
<td>page 9-5</td>
</tr>
<tr>
<td>auto-create-rfd-template</td>
<td>Enables auto creation of a new RF Domain based on an existing RF Domain template specified using this command</td>
<td>page 9-10</td>
</tr>
<tr>
<td>default-adoption</td>
<td>Adopts devices even when no matching rules are found. Assigns default profile and default RF Domain</td>
<td>page 9-12</td>
</tr>
<tr>
<td>deny</td>
<td>Adds a deny adoption rule</td>
<td>page 9-13</td>
</tr>
<tr>
<td>evaluate-always</td>
<td>Runs this policy every time a device is adopted</td>
<td>page 9-16</td>
</tr>
<tr>
<td>redirect</td>
<td>Adds a rule redirecting device adoption to a specified controller within the system</td>
<td>page 9-17</td>
</tr>
<tr>
<td>upgrade</td>
<td>Adds a device upgrade rule to this auto provisioning policy</td>
<td>page 9-21</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 9-24</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see *Chapter 5, COMMON COMMANDS.*
9.1.1 adopt

> auto-provisioning-policy

Adds device adoption rules

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
adopt [anyap|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rf-domain |nx5500|nx65xx|nx7500|nx7510|nx7520|nx7530|nx9000|vx9000|nx9600] precedence <1-10000>
```

**Parameters**

- **adopt**
  - Adds an adopt device rule. The rule applies to the selected device types. Specify the device type and assign a precedence to the rule.
  - The different device types are: anyap, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, AP7502, AP7522
  - nx5500 nx65xx nx7500 nx7510 nx7520 nx7530 nx9000 vx9000 nx9600 precedence <1-10000>

**Note:** 'anyap' is used in auto provisioning policies to create rules that are applicable to any AP regardless of the type.

**precedence**

- Sets the rule precedence from 1 - 10000. A rule with a lower value has a higher precedence.
<table>
<thead>
<tr>
<th><strong>profile</strong> (&lt;\text{DEVICE-PROFILE-NAME}&gt;)</th>
<th>Sets the device profile for this provisioning policy. The selected device profile must be appropriate for the device being provisioned. For example, use an AP650 device profile for an AP650. Using an inappropriate device profile can result in unpredictable results. Provide a device profile name. Provide a device profile name (should be existing and configured). Or a template with appropriate substitution tokens, such as ‘campus-$\text{MODEL}[1:6]$, ‘FQDN[1:4]-indoor’. Please see the Usage Guidelines section <em>Built-in Tokens &amp; Alias</em> for the different types of built in tokens available in the system.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>rf-domain</strong> (&lt;\text{RF-DOMAIN-NAME}&gt;)</td>
<td>Sets the RF Domain for this auto provisioning policy. The provisioning policy is only applicable to devices that try to become a part of the specified RF Domain. Provide the full RF Domain name OR use a string alias to identify the RF Domain. Provide the full RF Domain name or an alias (should be existing and configured). Or a template with appropriate substitution tokens, such as ‘$\text{CDP}[1:7]$, ‘$\text{DNS-SUFFIX}[1:5]’ Please see the Usage Guidelines section <em>Built-in Tokens &amp; Alias</em> for the different types of built in tokens available in the system. <strong>Note:</strong> Use the built-in string alias or a user-defined string alias. String aliases allow you to configure APs in the same RF Domain as the adopting controller. A string alias maps a name to an arbitrary string value, for example, ‘alias string $\text{DOMAIN test.example_company.com}$. In this example, the string-alias $\text{DOMAIN}$ is mapped to the string: <em>test.example_company.com</em>. For more information, see <em>alias</em>.</td>
</tr>
<tr>
<td><strong>any</strong></td>
<td>Indicates any device. Any device seeking adoption is adopted.</td>
</tr>
<tr>
<td>• adopt [anyap</td>
<td>ap621</td>
</tr>
<tr>
<td><strong>precedence</strong> &lt;1-10000&gt;</td>
<td>Sets the rule precedence. A rule with a lower value has a higher precedence.</td>
</tr>
<tr>
<td><strong>profile</strong> (&lt;\text{DEVICE-PROFILE-NAME}&gt;)</td>
<td>Sets the device profile for this provisioning policy. The selected device profile must be appropriate for the device being provisioned. For example, use an AP650 device profile for an AP650. Using an inappropriate device profile can result in unpredictable results. Provide a device profile name (should be existing and configured). Or a template with appropriate substitution tokens, such as ‘campus-$\text{MODEL}[1:6]$, ‘FQDN[1:4]-indoor’. Please see the Usage Guidelines section <em>Built-in Tokens &amp; Alias</em> for the different types of built in tokens available in the system.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>rf-domain &lt;RF-DOMAIN-NAME&gt;</td>
<td>Sets the RF Domain for this auto provisioning policy. The provisioning policy is only applicable to devices that try to become a part of the specified RF Domain. Provide the full RF Domain name or an alias (should be existing and configured). Or a template with appropriate substitution tokens, such as '$CDP[1:7]', '$DNS-SUFFIX[1:5]'. Please see the Usage Guidelines section Built-in Tokens &amp; Alias for the different types of built in tokens available in the system. <strong>Note:</strong> Use the built-in string alias or a user-defined string alias. String aliases allow you to configure APs in the same RF Domain as the adopting controller. A string alias maps a name to an arbitrary string value, for example, ‘alias string $DOMAIN test.example_company.com’. In this example, the string-alias $DOMAIN is mapped to the string: test.example_company.com. For more information, see alias.</td>
</tr>
<tr>
<td>area &lt;AREA-NAME&gt;</td>
<td>Matches the area of deployment. This option is not applicable to the ‘rf-domain’ parameter.</td>
</tr>
<tr>
<td></td>
<td>• &lt;AREA-NAME&gt; – Enter a 64 character maximum deployment area name assigned to this policy. Devices with matching area names are adopted.</td>
</tr>
<tr>
<td>cdp-match &lt;LOCATION-SUBSTRING&gt;</td>
<td>Matches a substring in a list of CDP snoop strings (case insensitive). For example, if an access point snooped 3 devices: controller1.example.com, controller2.example.com, and controller3.example.com, 'controller1', 'example', 'example.com', are examples of the substrings that will match.</td>
</tr>
<tr>
<td></td>
<td>• &lt;LOCATION-SUBSTRING&gt; – Specify the value to match. Devices matching the specified value are adopted.</td>
</tr>
<tr>
<td>dhcp-option &lt;DHCP-OPTION&gt;</td>
<td>Matches the value found in DHCP vendor option 191 (case insensitive). DHCP vendor option 191 can be setup to communicate various configuration parameters to an AP. The value of the option in a string in the form of tag=value separated by a semicolon, for example ‘tag1=value1;tag2=value2;tag3=value3’. The access point includes the value of tag 'rf-domain', if present.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DHCP-OPTION&gt; – Specify the DHCP option. Devices matching the specified value are adopted.</td>
</tr>
<tr>
<td>floor &lt;FLOOR-NAME&gt;</td>
<td>Matches the floor name. This option is not applicable to the ‘rf-domain’ parameter.</td>
</tr>
<tr>
<td></td>
<td>• &lt;FLOOR-NAME&gt; – Enter a 32 character maximum deployment floor name assigned to this policy. Devices with matching floor names are adopted.</td>
</tr>
<tr>
<td>fqdn &lt;FQDN&gt;</td>
<td>Matches a substring to the <strong>Fully Qualified Domain Name</strong> (FQDN) of a device (case insensitive) FQDN is a domain name that specifies its exact location in the DNS hierarchy. It specifies all domain levels, including its top-level domain and the root domain. This parameter allows a device to adopt based on its FQDN value.</td>
</tr>
<tr>
<td></td>
<td>• &lt;FQDN&gt; – Specify the FQDN. Devices matching the specified value are adopted.</td>
</tr>
<tr>
<td>ip [START-IP] &lt;END-IP&gt;]</td>
<td>Adopts a device if its IP address matches the specified IPv4 address or is within the specified IP address range. Or if the device is a part of the specified subnet.</td>
</tr>
<tr>
<td></td>
<td>• &lt;START-IP&gt; – Specify the first IPv4 address in the range.</td>
</tr>
<tr>
<td></td>
<td>• &lt;END-IP&gt; – Specify the last IPv4 address in the range.</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP/MASK&gt; – Specify the IPv4 subnet and mask to match against the device's IP address.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| ipv6 [<START-IP><END-IP>][<IP/MASK>]| Adopts a device if its IP v6 address matches the specified IPv6 address or is within the specified IP address range. Or if the device is a part of the specified subnet.  
  • <START-IP> – Specify the first IPv6 address in the range.  
  • <END-IP> – Specify the last IPv6 address in the range.  
  • <IP/MASK> – Specify the IPv6 subnet and mask to match against the device's IPv6 address. |
| lldp-match <LLDP-STRING> | Matches a substring in a list of Link Layer Discovery Protocol (LLDP) snoop strings (case insensitive). For example, if an access point snooped 3 devices: controller1.example.com, controller2.example.com, and controller3.example.com,'controller1', 'example', 'example.com', are examples of the substrings that will match.  
  LLDP is a vendor neutral link layer protocol that advertises a network device's identity, capabilities, and neighbors on a local area network.  
  • <LLDP-STRING> – Specify the LLDP string. Devices matching the specified value are adopted. |
| mac <START-MAC>{<END-MAC>}> | Adopts a device if its MAC address matches the specified MAC address or is within the specified MAC address range  
  • <START-MAC> – Specify the first MAC address in the range. Provide this MAC address if you want to match for a single device.  
  • <END-MAC> – Optional. Specify the last MAC address in the range. |
| model-number <MODEL-NUMBER> | Adopts a device if its model number matches <MODEL-NUMBER>  
  • <MODEL-NUMBER> – Specify the model number. |
| rf-domain <RF-DOMAIN-NAME> | Adopts a device if its RF Domain matches <RF-DOMAIN-NAME>  
  <RF-DOMAIN-NAME> – Specify the RF Domain name. You can use a string alias to specify a RF Domain.  
  Provide the full RF Domain name or an alias (should be existing and configured). Or a template with appropriate substitution tokens, such as '$CDP[1:7]', '$DNS-SUFFIX[1:5]'  
  Please see the Usage Guidelines section Built-in Tokens & Alias for the different types of built in tokens available in the system.  
  **Note:** Use the built-in string alias or a user-defined string alias. String aliases allow you to configure APs in the same RF Domain as the adopting controller. A string alias maps a name to an arbitrary string value, for example, ‘(alias string $DOMAIN test.example_company.com’). In this example, the string-alias $DOMAIN is mapped to the string: test.example_company.com. For more information, see alias. |
| serial-number <SERIAL-NUMBER> | Adopts a device if its serial number matches <SERIAL-NUMBER>  
  • <SERIAL-NUMBER> – Specify the serial number. |
| vlan <VLAN-ID> | Adopts a device if its VLAN matches <VLAN-ID>  
  • <VLAN-ID> – Specify the VLAN ID. |
Usage Guidelines Built-in Tokens & Alias

Following are the built-in tokens that can be used to identify the devices to adopt:

- `$FQDN` - references FQDN of adopting device
- `$CDP` - references CDP Device Id of which adopting to which adopting device is connected
- `$LLDP` - references LLDP System Name of wired switch to which adopting device is connected
- `$DHCP` - references DHCP Option Value received by the adopting device
- `$SN` - references SERIAL NUMBER of adopting device
- `$MODEL` - references MODEL NUMBER of adopting device
- `$DNS-SUFFIX` - references FQDN excluding the hostname of the adopting device
- `$CDP-SUFFIX` - references CDP excluding the hostname of the adopting device
- `$LLDP-SUFFIX` - references LLDP excluding the hostname of the adopting device

Following is the built-in alias that can be used to identify the RF Domain of devices to adopt:

- `$_builtin_rf-domain` - rf-domain of adopting device

Examples

```bash
rfs4000-229D58(config-auto-provisioning-policy-test)#adopt ap81xx precedence 1 profile default-ap81xx vlan 1

rfs4000-229D58(config-auto-provisioning-policy-test)#show context auto-provisioning-policy test
adopt ap81xx precedence 1 profile default-ap81xx vlan 1
rfs4000-229D58(config-auto-provisioning-policy-test)#

rfs4000-229D58(config-auto-provisioning-policy-test)#show wireless ap configured
```

<table>
<thead>
<tr>
<th>IDX</th>
<th>NAME</th>
<th>MAC</th>
<th>PROFILE</th>
<th>RF-DOMAIN</th>
<th>ADOPTED-BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ap81xx-711728</td>
<td>B4-C7-99-71-17-28</td>
<td>default-ap81xx</td>
<td>default</td>
<td>00-23-68-22-9D-58</td>
</tr>
<tr>
<td>2</td>
<td>rfs4000-229D58</td>
<td>00-23-68-22-9D-58</td>
<td>default-rfs4000</td>
<td>default</td>
<td></td>
</tr>
</tbody>
</table>

```bash
rfs7000-6DCD4B(config-auto-provisioning-policy-test)#adopt anyap precedence 1 profile rfs7000 any

rfs7000-6DCD4B(config-auto-provisioning-policy-test)#show context auto-provisioning-policy test
adopt anyap precedence 1 profile rfs7000 any
rfs7000-6DCD4B(config-auto-provisioning-policy-test)#
```

Related Commands

- `no` - Removes an adopt rule
9.1.2 auto-create-rfd-template

Enables auto creation of an RF Domain:
- when tokens are used to select the RF Domain to apply to devices matching the adoption criteria, and
- the token-specified RF Domain does not exist.

During device adoption, if the token-specified RF Domain (configured using the ‘adopt’ rule) is not found, the system auto creates a new RF Domain based on an existing RF Domain template specified using this command. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
auto-create-rfd-template <RF-DOMAIN-NAME>

Parameters
- auto-create-rfd-template <RF-DOMAIN-NAME>

| auto-creates-rfd-template <RF-DOMAIN-NAME> | Auto creates a new RF Domain based on an existing RF Domain template
|                                           | • <RF-DOMAIN-NAME> – Specify the RF Domain name (should be existing and configured). The new RF Domain created is saved with the token name specified in the ‘adopt’ command.
|                                           | **Note:** For more information on configuring tokens, see adopt.

Examples
The following example configures an adopt rule for adopting any AP7532 and applying an RF Domain matching the token "$MODEL[1:5]" to the adopted AP:

```
nx9500-6C8809(config-auto-provisioning-policy-test)#adopt ap7532 precedence 20 rf-domain $MODEL[1:5] any
```

nx9500-6C8809(config-auto-provisioning-policy-test)#show context
auto-provisioning-policy test
  adopt ap7532 precedence 20 rf-domain $MODEL[1:5] any

nx9500-6C8809(config-auto-provisioning-policy-test)#

The following example enables auto creation of the following RF Domain using an existing RF Domain ‘rfd-AP’ as template:
- RF Domain name "AP-75": Applicable to any AP7532

```
nx9500-6C8809(config-auto-provisioning-policy-test)#auto-create-rfd-template rfd-AP
```

nx9500-6C8809(config-auto-provisioning-policy-test)#show context
auto-provisioning-policy test
  adopt ap7532 precedence 20 rf-domain $MODEL[1:5] any
auto-create-rfd-template rfd-AP

nx9500-6C8809(config-auto-provisioning-policy-test)#

As per the above configurations, when an AP7532 comes up for first-time adoption, the system:
- Checks for an RF Domain matching the options provided in the ‘adopt’ rule, and if not found
- auto creates the RF Domain only if:
  • A token is specified in the ‘adopt’ rule. For example, $MODEL[1:5], and
• the ‘auto-create-rfd-template’ option is configured
• Uses the ‘RF Domain’ specified in the auto-create-rfd-template command as a template. Therefore, the specified RF Domain should be existing and configured.
• Applies the new RF Domain to the AP.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables auto creation of an RF Domain</td>
</tr>
</tbody>
</table>
9.1.3 **default-adoption**

* auto-provisioning-policy

Adopts devices, even when no matching rules are defined, and assigns a default profile and default RF Domain to the adopted device

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**
default-adoption

**Parameters**
None

**Examples**
rfs4000-229D58(config-auto-provisioning-policy-test)#default-adoption
rfs4000-229D58(config-auto-provisioning-policy-test)#show context auto-provisioning-policy test
default-adoption
adopt ap81xx precedence 1 profile default-ap81xx vlan 1
rfs4000-229D58(config-auto-provisioning-policy-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables adoption of devices when matching rules are not found</td>
</tr>
</tbody>
</table>
9.1.4 deny

Defines a deny device adoption rule

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP91XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`deny [any|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx7500|nx7510|nx7520|nx7530|nx9000|nx9500|nx9600]`  

`deny [any|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx7500|nx7510|nx7520|nx7530|nx9000|nx9500|nx9600] precedence <1-10000>`

`deny [any|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx7500|nx7510|nx7520|nx7530|nx9000|nx9500|nx9600] precedence <1-10000>`

`deny [any|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rfs4000|rfs6000|rfs7000|nx45xx|nx5500|nx65xx|nx7500|nx7510|nx7520|nx7530|nx9000|nx9500|nx9600] precedence <1-10000>`

Parameters

- `deny` Adds a deny adoption rule. The rule applies to the selected device types. Specify the device type and assign a precedence to the rule.
  - The different device types are: anyap, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, NX9500, NX9600, and anyap.
  - 'anyap' is used in auto provisioning policies to create rules that are applicable to any AP regardless of the type.

- `precedence <1-10000>` Sets the rule precedence. A rule with a lower value has a higher precedence.

- `any` Indicates any device. Any device seeking adoption is denied adoption.
denies adds a deny adoption rule. the rule applies to the selected device types. specify the device type and assign a precedence to the rule.

the different device types are: anyap, ap621, ap622, ap650, ap6511, ap6521, ap6522, ap6562, ap71xx, ap7502, ap7522, ap7532, ap7562, ap81xx, ap82xx, ap8432, ap8533, rfs4000, rfs6000, rfs7000, nx45xx, nx5500, nx55xx, nx7500, nx7510, nx7520, nx7530, nx9000, nx9600.

precedence <1-10000>

sets the rule precedence. a rule with a lower value has a higher precedence. after specifying the rule precedence, specify the match criteria. devices matching the specified criteria are denied adoption.

cdp-match <LOCATION-SUBSTRING>

matches a substring in a list of CDP snoop strings (case insensitive). for example, if an access point snooped 3 devices: controller1.example.com, controller2.example.com and controller3.example.com, 'controller1', 'example', 'example.com', are examples of the substrings that will match.

- <LOCATION-SUBSTRING> – specify the value to match. devices matching the specified value are denied adoption.

dhcp-option <DHCP-OPTION>

matches the value found in DHCP vendor option 191 (case insensitive). DHCP vendor option 191 can be setup to communicate various configuration parameters to an AP. the value of the option in a string in the form of tag=value separated by a semicolon, for example 'tag1=value1;tag2=value2;tag3=value3'. the access point includes the value of tag 'rf-domain', if present.

- <DHCP-OPTION> – specify the DHCP option value to match. devices matching the specified value are denied adoption.

fqdn <FQDN>

matches a substring to the FQDN of a device (case insensitive)

FQDN is a domain name that specifies its exact location in the DNS hierarchy. it specifies all domain levels, including its top-level domain and the root domain.

- <FQDN> – specify the FQDN. devices matching the specified value are denied adoption.

ip [<START-IP> <END-IP> | <IP/MASK>]

denies adoption if a device’s IP address matches the specified IPv4 address or is within the specified IP address range

- <START-IP> – specify the first IPv4 address in the range.
- <END-IP> – specify the last IPv4 address in the range.
- <IP/MASK> – specify the IPv4 subnet and mask to match against the device’s IP address.

ipv6 [<START-IP> <END-IP> | <IP/MASK>]

denies adoption if a device’s IPv6 address matches the specified IPv6 address or is within the specified IP address range

- <START-IP> – specify the first IPv6 address in the range.
- <END-IP> – specify the last IPv6 address in the range.
- <IP/MASK> – specify the IPv6 subnet and mask to match against the device’s IP address.
### Examples

```bash
rfs4000-229D58(config-auto-provisioning-policy-test)#deny ap71xx precedence 2 model-number AP7131N

rfs4000-229D58(config-auto-provisioning-policy-test)#deny ap71xx precedence 3 ip 192.168.13.23 192.168.13.23

rfs4000-229D58(config-auto-provisioning-policy-test)#show context auto-provisioning-policy test
deny ap71xx precedence 2 profile default-ap81xx vlan 1
deny ap71xx precedence 3 ip 192.168.13.23 192.168.13.23
```

### Related Commands

- **no**  
  Removes a deny adoption rule
9.1.5 evaluate-always

- auto-provisioning-policy

Sets flag to run this auto-provisioning policy every time an access point is adopted. The access point's previous adoption status is not taken into consideration.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

evaluate-always

Parameters

None

Examples

rfs4000-229D58(config-auto-provisioning-policy-test)#evaluate-always

rfs4000-229D58(config-auto-provisioning-policy-test)#show context auto-provisioning-policy test evaluate-always

rfs4000-229D58(config-auto-provisioning-policy-test)#

Related Commands

- **no** — Disables the running of this policy every time an AP is adopted
9.1.6 redirect

`auto-provisioning-policy`

Adds a rule redirecting device adoption to another controller within the system. Devices seeking adoption are redirected to a specified controller based on the redirection parameters specified.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
redirect [anyap|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap81xx|ap82xx|ap8432|ap8533|rf4000|rf6000|rf7000|nx45xx|nx5500|nx65xx|nx7500|nx7510|nx7520|nx7530|nx9000|vx9000|nx9600] precedence <1-10000> controller [<CONTROLLER-IP>|<CONTROLLER-HOSTNAME>] [any|cdp-match|dhcp-option|fqdn|ip|ipv6|level|lldp-match|mac|model-number|pool|serial-number|vlan]
```

Parameters

- `redirect anyap|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|ap7522|ap7532|ap81xx|ap82xx|ap8432|ap8533|rf4000|rf6000|rf7000|nx45xx|nx5500|nx65xx|nx7500|nx7510|nx7520|nx7530|nx9000|vx9000|nx9600] precedence <1-10000> controller [<CONTROLLER-IP>|<CONTROLLER-HOSTNAME>] [any|cdp-match|dhcp-option|fqdn|ip|ipv6|level|lldp-match|mac|model-number|pool|serial-number|vlan]

Note: `anyap` is used in auto provisioning policies to create rules that are applicable to any AP regardless of the type.

Note: An adoptee controller, such as RFS4000, RFS6000, and RFS7000, can be redirected to another controller (configured to adopt controllers) with a capacity equal to or higher than its own. For more information, see `controller`.

| precedence | Sets the rule precedence. Rules with lower values get precedence over rules with higher values. |
redirect

- <CONTROLLER-IP> – Specifies the controller’s IP address
- <CONTROLLER-HOSTNAME> – Specifies the controller’s hostname
- ipv6 – Specify the controller’s IPv6 address

any

Indicates any device. Any device seeking adoption is redirected.

controller

Specifies the controller to which the adopting devices are redirected. Specify the controller’s IP address or hostname.

- <CONTROLLER-IP> – Specifies the controller’s IP address
- <CONTROLLER-HOSTNAME> – Specifies the controller’s hostname
- ipv6 – Specify the controller’s IPv6 address

precedence <1-10000>

Sets the rule precedence. Rules with lower values get precedence over rules with higher values.

redirect

Adds a redirect adoption rule. The rule applies to the device type selected. Specify the device type and assign a precedence to the rule.

The different device type options are: anyap, AP621, AP622, AP650, AP651, AP652, AP71XX, AP7502, AP7522, AP81XX, AP82XX, AP833, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, VX9000, and NX9600.

Note: An adoptee controller, such as RFS4000, RFS6000, and RFS7000, can be redirected to another controller (configured to adopt controllers) with a capacity equal to or higher than its own. For more information, see controller.

cdp-match <LOCATION-SUBSTRING>

Configures the device location to match, based on CDP snoop strings

• <LOCATION-SUBSTRING> – Specify the location. Devices matching the specified string are redirected.

dhcp-option <DHCP-OPTION>

Configures the DHCP options to match

DHCP options identify the vendor and DHCP client functionalities. This information is used by the client to convey to the DHCP server that the client requires extra information in a DHCP response.

• <DHCP-OPTION> – Specify the DHCP option value. Devices matching the specified value are redirected.

fqdn <FQDN>

Configures the FQDN to match

FQDN is a domain name that specifies its exact location in the DNS hierarchy. It specifies all domain levels, including its top-level domain and the root domain.

• <FQDN> – Specify the FQDN. Devices matching the specified value are redirected.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| ip `<START-IP>` `<END-IP>` `<IP/MASK>` | Configures a range of IP addresses and subnet address. Devices having IPv4 addresses within the specified range or are part of the specified subnet are redirected.  
  - `<START-IP>` – Specify the first IPv4 address in the range.  
  - `<END-IP>` – Specify the last IPv4 address in the range.  
  - `<IP/MASK>` – Specify the IPv4 subnet and mask to match against the device’s IP address. |
| level[1|2] | Configures the routing level  
  - level1 – Specifies level 1 as local routing  
  - level2 – Specifies level2 as inter-site routing |
| ipv6 `<START-IP>` `<END-IP>` `<IP/MASK>` | Redirects if a device's IPv6 address matches the specified IP address or is within the specified IP address range  
  - `<START-IP>` – Specify the first IPv6 address in the range.  
  - `<END-IP>` – Specify the last IPv6 address in the range.  
  - `<IP/MASK>` – Specify the IPv6 subnet and mask to match against the device’s IP address. |
| lldp-match `<LLDP-STRING>` | Configures the device location to match, based on LLDP snoop strings  
  LLDP is a vendor neutral link layer protocol used to advertise a network device’s identity, capabilities, and neighbors on a local area network.  
  - `<LLDP-STRING>` – Specify the location. Devices matching the specified string are redirected. |
| mac `<START-MAC>` `{<END-MAC>}` | Configures a single or a range of MAC addresses. Devices matching the specified values are redirected.  
  - `<START-MAC>` – Specify the first MAC address in the range. Provide only this MAC address to filter a single device.  
  - `<END-MAC>` – Optional. Specify the last MAC address in the range. |
| model-number `<MODEL-NUMBER>` | Configures the device model number  
  - `<MODEL-NUMBER>` – Specify the model number. Devices matching the specified model number are redirected. |
| pool `<1-2>` | Configures the controller pool  
  - `<1-2>` – Configures the pool to which the specified controller belongs to. The default pool value is 1. |
| serial-number `<SERIAL-NUMBER>` | Configures the device’s serial number  
  - `<SERIAL-NUMBER>` – Specify the serial number. Devices matching the specified serial number are redirected. |
| vlan `<VLAN-ID>` | Configures the VLAN ID  
  - `<VLAN-ID>` – Specify the VLAN ID. Devices assigned to the specified VLAN are redirected. |
| upgrade | Optional. Upgrades APs before redirecting the device for adoption within the system |
## Examples


rfs4000-229D58(config-auto-provisioning-policy-test)#redirect ap81xx precedence 5 controller 192.168.13.10 model-number AP-8132-66040-US

rfs4000-229D58(config-auto-provisioning-policy-test)#show context auto-provisioning-policy test
  adopt ap81xx precedence 1 profile default-ap81xx vlan 1
  deny ap71xx precedence 2 model-number AP7131N
  deny ap71xx precedence 3 ip 192.168.13.23 192.168.13.23
  redirect ap81xx precedence 5 controller 192.168.13.10 model-number AP-8132-66040-US
rfs4000-229D58(config-auto-provisioning-policy-test)#

rfs4000-229D58(config-auto-provisioning-policy-test)#redirect ap621 precedence 1 controller host ip 192.168.13.4 192.168.13.8 upgrade
rfs4000-229D58(config-auto-provisioning-policy-test)#show context auto-provisioning-policy test
  redirect ap621 precedence 1 controller host ip 192.168.13.4 192.168.13.8 upgrade
rfs4000-229D58(config-auto-provisioning-policy-test)#

## Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes a redirect rule</td>
</tr>
</tbody>
</table>
9.1.7 upgrade

Add a device upgrade rule to this auto provisioning policy. When applied to a controller, the upgrade rule ensures adopted devices, of the specified type, are upgraded automatically.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
upgrade[anyap|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap7502|
ap7522|ap7532|ap7562|ap81xx|ap82xx|ap8432|ap8533|rf4000|rf6000|rf7000|nx45xx|
nx5500|nx65xx|nx7500|nx7510|nx7520|nx7530|nx9000|vx9000|nx9600]
```

**Parameters**

- `upgrade` Adds a device upgrade rule. The rule applies to the device type selected. Specify the device type and assign a precedence to the rule.
  - The different device types are: anyap, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX4500, NX5500, NX65XX, NX75XX, NX9000, VX9000, and NX9600 series.
- `precedence <1-10000>` Sets the rule precedence. Rules with lower values get precedence over rules with higher values.
- `any` Indicates any device. Any device, of the selected type, is upgraded. For example, if the device type selected is AP621, any AP621 device is upgraded.
The different device types are: anyap, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP5622, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, RFS4000, RFS6000, RFS7000, NX45XX, NX5500, NX65XX, NX75XX, NX9000, VX9000, and NX9600 series.

Note: ‘anyap’ is used in auto provisioning policies to create rules that are applicable to any AP regardless of the type.

### Precedence

Sets the rule precedence. Rules with lower values get precedence over rules with higher values.

### CDP-Match

Configures the device location to match, based on CDP snoop strings

- `<LOCATION-SUBSTRING>` – Specify the location. Devices matching the specified string are upgraded.

### DHCP-Option

Configures the DHCP options to match

DHCP options identify the vendor and DHCP client functionalities. This information is used by the client to convey to the DHCP server that the client requires extra information in a DHCP response.

- `<DHCP-OPTION>` – Specify the DHCP option value. Devices matching the specified value are upgraded.

### FQDN

Configures the FQDN to match

FQDN is a domain name that specifies its exact location in the DNS hierarchy. It specifies all domain levels, including its top-level domain and the root domain.

- `<FQDN>` – Specify the FQDN. Devices matching the specified value are upgraded.

### IP

Configures a range of IP addresses and subnet address. Devices having IPv4 addresses within the specified range or are part of the specified subnet are upgraded.

- `<START-IP>` – Specify the first IPv4 address in the range.
- `<END-IP>` – Specify the last IPv4 address in the range.
- `<IP/MASK>` – Specify the IPv4 subnet and mask to match against the device’s IP address.

### IPv6

Upgrades if a device’s IPv6 address matches the specified IP address or is within the specified IP address range

- `<START-IP>` – Specify the first IPv6 address in the range.
- `<END-IP>` – Specify the last IPv6 address in the range.
- `<IP/MASK>` – Specify the IPv6 subnet and mask to match against the device’s IP address.

### LLDP-Match

Configures the device location to match, based on LLDP snoop strings

LLDP is a vendor neutral link layer protocol used to advertise a network device’s identity, capabilities, and neighbors on a local area network.

- `<LLDP-STRING>` – Specify the location. Devices matching the specified string are upgraded.
### AUTO-PROVISIONING-POLICY 9-23

**Examples**

```bash
rfs4000-229D58(config-auto-provisioning-policy-test)#upgrade ap621 precedence 1 any
rfs4000-229D58(config-auto-provisioning-policy-test)#upgrade rfs4000 precedence 2 ip 192.168.13.1 192.168.13.5
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an upgrade rule</td>
</tr>
</tbody>
</table>
9.1.8 no

 auto-provisioning-policy

Removes a deny, permit, or redirect rule from the specified auto provisioning policy

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [adopt|auto-create-rfd-template|default-adoption|deny|evaluate-always|redirect|upgrade]
no adopt precedence <1-10000>
no auto-create-rfd-template
no deny precedence <1-10000>
no evaluate-always
no default-adoption
no redirect precedence <1-10000>
no upgrade precedence <1-10000>

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes a deny, permit, or redirect rule from the specified auto provisioning policy |

Examples

The following example shows the auto-provisioning-policy 'test' settings before the 'no' commands are executed:

```bash
rfs4000-229D58(config-auto-provisioning-policy-test)#show context
auto-provisioning-policy test
  adopt ap81xx precedence 1 profile default-ap81xx vlan 1
deny ap71xx precedence 2 model-number AP7131N
deny ap71xx precedence 3 ip 192.168.13.23 192.168.13.23
redirect ap81xx precedence 5 controller 192.168.13.10 model-number AP-8132-66040-US
rfs4000-229D58(config-auto-provisioning-policy-test)#
```

The following example shows the auto-provisioning-policy 'test' settings after the 'no' commands are executed:

```bash
rfs4000-229D58(config-auto-provisioning-policy-test)#no default-adoption
rfs4000-229D58(config-auto-provisioning-policy-test)#no deny precedence 2
rfs4000-229D58(config-auto-provisioning-policy-test)#no deny precedence 3
rfs4000-229D58(config-auto-provisioning-policy-test)#no deny precedence 5
rfs4000-229D58(config-auto-provisioning-policy-test)#
```

The following example shows the auto-provisioning-policy 'test' settings before the 'no' commands are executed:

```bash
rfs4000-229D58(config-auto-provisioning-policy-test)#show context
auto-provisioning-policy test
  adopt ap81xx precedence 1 rf-domain TechPubs vlan 1
rfs4000-229D58(config-auto-provisioning-policy-test)#
```

The following example shows the auto-provisioning-policy 'test' settings after the 'no' commands are executed:

```bash
rfs4000-229D58(config-auto-provisioning-policy-test)#no upgrade precedence 1
rfs4000-229D58(config-auto-provisioning-policy-test)#
```
This chapter summarizes the association ACL policy commands in the CLI command structure. An association ACL is a policy-based Access Control List (ACL) that either prevents or allows wireless clients from connecting to a controller managed WLAN.

System administrators can use an association ACL to grant or restrict wireless clients access to the WLAN by specifying client MAC addresses or range of MAC addresses to either include or exclude from controller connectivity. Association ACLs are applied to WLANs as an additional access control mechanism.

Use the (config) instance to configure the association ACL policy. To navigate to the association-acl-policy instance, use the following commands:

```
<DEVICE>(config)#association-acl-policy <POLICY-NAME>
rfs7000-37FABE(config)#association-acl-policy test
rfs7000-37FABE(config-assoc-acl-test)#
```

Association ACL Mode commands:
- `deny` Specify MAC addresses to be denied
- `no` Negate a command or set its defaults
- `permit` Specify MAC addresses to be permitted
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
rfs7000-37FABE(config-assoc-acl-test)#
```

**NOTE:** If creating a new association ACL policy, provide a name specific to its function. Avoid naming it after a WLAN it may support. The name cannot exceed 32 characters.
Before defining an association ACL policy and applying it to a WLAN, refer to the following deployment guidelines to ensure the configuration is optimally effective:

- The name and configuration of an association ACL policy should meet the requirements of the WLANs it may map to. However, be careful not to name ACLs after specific WLANs, as individual ACL policies can be used by more than one WLAN.
- You cannot apply more than one MAC based ACL to a layer 2 interface. If a MAC ACL is already configured on a layer 2 interface, and a new MAC ACL is applied to the interface, the new ACL replaces the previously configured one.

**NOTE:** The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
10.1 association-acl-policy

The following table summarizes association ACL policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny</td>
<td>Specifies a range of MAC addresses denied access to the WLAN</td>
<td>page 10-4</td>
</tr>
<tr>
<td>no</td>
<td>Removes a deny or permit rule from this association ACL policy</td>
<td>page 10-6</td>
</tr>
<tr>
<td>permit</td>
<td>Specifies a range of MAC addresses allowed access to the WLAN</td>
<td>page 10-7</td>
</tr>
</tbody>
</table>

NOTE: For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
10.1.1 deny

`association-acl-policy`

Creates a list of devices denied access to the managed network. Devices are identified by their MAC address. A single MAC address or a range of MAC addresses can be denied access. This command also sets the precedence on how deny rules are applied. Up to a thousand (1000) deny rules can be defined for every association ACL policy. Each rule has a unique sequential precedence value assigned, and are applied to packets on the basis of this precedence value. Lower the precedence of a rule, higher is its priority. This results in the rule with the lowest precedence being applied first. No two rules can have the same precedence. The default precedence is 1, so be careful to prioritize ACLs accordingly as they are added.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

deny <STARTING-MAC> [ <ENDING-MAC> | precedence ]
deny <STARTING-MAC> precedence <1-1000>
deny <STARTING-MAC> <ENDING-MAC> precedence <1-1000>

Parameters
- `deny <STARTING-MAC> precedence <1-1000>`
- `deny <STARTING-MAC> <ENDING-MAC> precedence <1-1000>`

<table>
<thead>
<tr>
<th>deny</th>
<th>Adds a single device or a set of devices to the deny list</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;STARTING-MAC&gt;</td>
<td>To add a single device, enter its MAC address in the &lt;STARTING-MAC&gt; parameter.</td>
</tr>
<tr>
<td>precedence &lt;1-1000&gt;</td>
<td>Sets a precedence rule. Rules are applied in an increasing order of precedence.</td>
</tr>
<tr>
<td>• &lt;1-1000&gt;</td>
<td>Specify a precedence value from 1 - 1000.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>deny &lt;STARTING-MAC&gt; &lt;ENDING-MAC&gt; precedence &lt;1-1000&gt;</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>deny &lt;STARTING-MAC&gt;</td>
<td>Adds a single device or a set of devices to the deny list</td>
</tr>
<tr>
<td>To add a set of devices, provide the range of MAC addresses.</td>
<td></td>
</tr>
<tr>
<td>&lt;STARTING-MAC&gt;</td>
<td>Specify the first MAC address in the range.</td>
</tr>
<tr>
<td>&lt;ENDING-MAC&gt;</td>
<td>Specify the last MAC address in the range.</td>
</tr>
<tr>
<td>precedence &lt;1-1000&gt;</td>
<td>Sets a precedence rule. Rules are applied in an increasing order of precedence.</td>
</tr>
<tr>
<td>• &lt;1-1000&gt;</td>
<td>Specify a value from 1 - 1000.</td>
</tr>
</tbody>
</table>

Usage Guidelines

Every rule has a unique sequential precedence value. You cannot add two rules with the same precedence. Rules are applied in an increasing order of precedence. That means the rule with precedence 1 is applied first, then the rule with precedence 2 and so on.
Examples

rfs7000-37FABE(config-assoc-acl-test)#deny 11-22-33-44-55-01 11-22-33-44-55-FF precedence 150

rfs7000-37FABE(config-assoc-acl-test)#deny 11-22-33-44-56-01 11-22-33-44-56-01 precedence 160

rfs7000-37FABE(config-assoc-acl-test)#show context association-acl-policy test
deny 11-22-33-44-55-01 11-22-33-44-55-FF precedence 150
deny 11-22-33-44-56-01 11-22-33-44-56-01 precedence 160

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a deny rule based on its precedence value</td>
</tr>
</tbody>
</table>
10.1.2 no

Removes a deny or permit rule from this association ACL policy

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [deny|permit]

no deny <STARTING-MAC> precedence <1-1000>
no deny <STARTING-MAC> <ENDING-MAC> precedence <1-1000>

Parameters

- no <PARAMETERS>

Examples

The following example shows the association ACL policy ‘test’ settings before the ‘no’ commands is executed:

rfs7000-37FABE(config-assoc-acl-test)#show context
association-acl-policy test
  deny 11-22-33-44-55-01 11-22-33-44-55-FF precedence 150
  deny 11-22-33-44-56-01 11-22-33-44-56-01 precedence 160
rfs7000-37FABE(config-assoc-acl-test)#

rfs7000-37FABE(config-assoc-acl-test)#no deny 11-22-33-44-56-01 11-22-33-44-56-FF precedence 160

The following example shows the association ACL policy ‘test’ settings after the ‘no’ commands is executed:

rfs7000-37FABE(config-assoc-acl-test)#show context
association-acl-policy test
  deny 11-22-33-44-55-01 11-22-33-44-55-FF precedence 150
rfs7000-37FABE(config-assoc-acl-test)#
### 10.1.3 permit

Creates a list of devices allowed access to the managed network. Devices are permitted access based on their MAC address. A single MAC address or a range of MAC addresses can be specified. This command also sets the precedence on how permit list rules are applied. Up to a thousand (1000) permit rules can be defined for every association ACL policy. Each rule has a unique sequential precedence value assigned, and are applied to packets on the basis of this precedence value. Lower the precedence of a rule, higher is its priority. This results in the rule with the lowest precedence being applied first. No two rules can have the same precedence. The default precedence is 1, so be careful to prioritize ACLs accordingly as they are added.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

permit <STARTING-MAC> [<ENDING-MAC>|precedence]

permit <STARTING-MAC> precedence <1-1000>

permit <STARTING-MAC> <ENDING-MAC> precedence <1-1000>

#### Parameters

- **permit <STARTING-MAC> precedence <1-1000>**
  - Adds a single device or a set of devices to the permit list
  - To add a single device, enter its MAC address in the `<STARTING-MAC>` parameter.
  - Specifies a rule precedence. Rules are applied in an increasing order of precedence.
    - `<1-1000>` – Specify a value from 1 - 1000.

- **permit <STARTING-MAC> <ENDING-MAC> precedence <1-1000>**
  - Adds a single device or a set of devices to the permit list
  - To add a set of devices, provide the MAC address range.
  - Specify the first MAC address of the range.
  - Specify the last MAC address of the range.
  - Specifies a rule precedence. Rules are applied in an increasing order of precedence.
    - `<1-1000>` – Specify a value from 1 - 1000.

#### Usage Guidelines

Every rule has a unique sequential precedence value. You cannot add two rules with the same precedence. Rules are applied to packets in an increasing order of precedence. That means the rule with precedence 1 is applied first, then the rule with precedence 2 and so on.
Examples
rfs7000-37FABE(config-assoc-acl-test)# permit 11-22-33-44-66-01 11-22-33-44-66-FF precedence 170

rfs7000-37FABE(config-assoc-acl-test)# permit 11-22-33-44-67-01 precedence 180

rfs7000-37FABE(config-assoc-acl-test)# show context association-acl-policy test
deny 11-22-33-44-55-01 11-22-33-44-55-FF precedence 150
permit 11-22-33-44-66-01 11-22-33-44-66-FF precedence 170
permit 11-22-33-44-67-01 11-22-33-44-67-01 precedence 180

rfs7000-37FABE(config-assoc-acl-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a permit rule based on its precedence</td>
</tr>
</tbody>
</table>
This chapter summarizes IPv4, IPv6, and MAC access list commands in the CLI command structure.

Access lists control access to the managed network using a set of rules also known as Access Control Entries (ACEs). Each rule specifies an action taken when a packet matches that rule. If the action is deny, the packet is dropped. If the action is permit, the packet is allowed. A set of deny and/or permit rules based on IP (IPv4 and IPv6) addresses constitutes a IP Access Control List (ACL). Similarly, a set of deny and/or permit rules based on MAC addresses constitutes a MAC ACL.

Within a managed network, IP ACLs (IPv4 and IPv6) are used as firewalls to filter packets, and may also mark packets, based on the IP address which they arrive, as opposed to filtering packets on layer 2 ports. IP based firewall rules are specific to the source and destination IP addresses and have unique precedence orders assigned. Both IP and non-IP traffic on the same layer 2 or port interface can be filtered by applying an IP ACL. With either IPv4 or IPv6, create access rules for traffic entering a controller, service platform, or access point interface, because if you are going to deny specific types of packets, it’s recommended you do it before the controller, service platform, or access point spends time processing them, since access rules are given priority over other types of firewall rules.

IPv6 addresses are composed of eight groups of four hexadecimal digits separated by colons.

MAC ACLs are firewalls that filter or mark packets based on the MAC address which they arrive, as opposed to filtering packets on layer 2 ports. Optionally filter layer 2 traffic on a physical layer 2 interface using MAC addresses. A MAC firewall rule uses source and destination MAC addresses for matching operations, where the result is a typical allow, deny or mark designation to controller managed packet traffic.

Once defined, a IP and/or MAC ACL (consisting of a set of firewall rules) must be applied to an interface to be a functional filtering tool.

Firewall supported devices (access points, wireless controllers, and service platforms) process firewall rules (within an IP/MAC ACL) sequentially, in ascending order of their precedence value. When a packet (network traffic) matches a rule, the firewall applies the action specified in the rule to determine whether the traffic is allowed or denied. Once a match is made, the firewall does not process subsequent rules in the ACL.

The WiNG software enables the configuration of IP SNMP ACLs. These ACLs control access by combining IP ACLs with SNMP server community strings.

The following ACLs are supported:

- `ip-access-list`
- `mac-access-list`
- `ipv6-access-list`
- `ip-snmp-access-list`
- `ex3500-ext-access-list`
Use IP and MAC commands under the global configuration to create an access list.

- When the access list is applied on an Ethernet port, it becomes a port ACL.
- When the access list is applied on a VLAN interface, it becomes a router ACL.

Use the (config) instance to configure a new ACL or modify an existing ACL. To navigate to the (config-access-list) instance, use the following commands:

```
<DEVICE>(config)#ip access-list <IP-ACCESS-LIST-NAME>
<DEVICE>(config)#mac access-list <MAC-ACCESS-LIST-NAME>
<DEVICE>(config)#ipv6 access-list <IPv6-ACCESS-LIST-NAME>
<DEVICE>(config)#ip snmp-access-list <SNMP-ACCESS-LIST-NAME>
<DEVICE>(config)#ex3500-ext-access-list <EX3500-EXT-ACCESS-LIST-NAME>
<DEVICE>(config)#ex3500-std-access-list <EX3500-STD-ACCESS-LIST-NAME>
```

**NOTE:** If creating a new ACL policy, provide a name that uniquely identifies its purpose. The name cannot exceed 32 characters.

**ip-access-list**

```
rfs7000-37FABE(config)#ip access-list test
rfs7000-37FABE(config-ip-acl-test)#?
ACL Configuration commands:
deny    Specify packets to reject
disable Disable rule if not needed
insert   Insert this rule (instead of overwriting a existing rule)
no       Negate a command or set its defaults
permit   Specify packets to forward
clrscr   Clears the display screen
commit   Commit all changes made in this session
do      Run commands from Exec mode
end      End current mode and change to EXEC mode
exit     End current mode and down to previous mode
help     Description of the interactive help system
revert   Revert changes
service  Service Commands
show     Show running system information
write    Write running configuration to memory or terminal
```

```
rfs7000-37FABE(config-ip-acl-test)#
```

**mac-access-list**

```
rfs7000-37FABE(config)#mac access-list test
rfs7000-37FABE(config-mac-acl-test)#?
MAC Extended ACL Configuration commands:
deny    Specify packets to reject
disable Disable rule if not needed
ex3500  EX3500 device
insert   Insert this rule (instead of overwriting a existing rule)
no       Negate a command or set its defaults
permit   Specify packets to forward
clrscr   Clears the display screen
do      Run commands from Exec mode
commit   Commit all changes made in this session
end      End current mode and change to EXEC mode
```
The WiNG NOC controller also has the capabilities of adopting and managing EX3500 series switch. These switches are Gigabit Ethernet layer 2 switches with either 24 or 48 10/100/1000-BASE-T ports, and four Small Form Factor Pluggable (SFP) transceiver slots for fiber connectivity. Once adopted to the NOC, various ACLs specifically defined for a EX3500 switch can be used to either prevent or allow specific clients from using it.

The following EX3500 ACLs are supported:

- `ex3500-ext-access-list`
- `ex3500-std-access-list`
- `ex3500`: This configures a EX3500 deny or permit rule in a MAC ACL.

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
11.1 ip-access-list

ACCESS-LIST

The following table summarizes IP access list configuration commands:

**Table 11.1 IP-Access-List-Config Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny</td>
<td>Creates a deny access rule or modifies an existing rule. A deny access rule rejects packets from specified address(es) and/or destined for specified address(es).</td>
<td>page 11-5</td>
</tr>
<tr>
<td>disable</td>
<td>Disables an existing deny or permit rule without removing it from the ACL</td>
<td>page 11-16</td>
</tr>
<tr>
<td>insert</td>
<td>Inserts a rule in an IP ACL without overwriting or replacing an existing rule having the same precedence</td>
<td>page 11-19</td>
</tr>
<tr>
<td>no</td>
<td>Removes a deny and/or a permit access rule from a IP ACL</td>
<td>page 11-21</td>
</tr>
<tr>
<td>permit</td>
<td>Creates a permit access rule or modifies an existing rule. A permit access rule accepts packets from specified address(es) and/or destined for specified address(es).</td>
<td>page 11-22</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
11.1.1 deny

ip-access-list

Creates a deny rule that rejects packets from a specified source IP and/or to a specified destination IP. You can also use this command to modify an existing deny rule.

**NOTE:** Use a decimal value representation to implement a permit/deny designation for a packet. The command set for IP ACLs provides the hexadecimal values for each listed EtherType. Use the decimal equivalent of the EtherType listed for any other EtherType.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

deny [〈NETWORK-SERVICE-ALIAS-NAME〉|dns-name|icmp|ip|proto|tcp|udp]
deny 〈NETWORK-SERVICE-ALIAS-NAME〉 [〈SOURCE-IP/MASK〉|〈NETWORK-GROUP-ALIAS-NAME〉|any|from-vlan 〈VLAN-ID〉|host 〈SOURCE-HOST-IP〉] [〈DEST-IP/MASK〉|any|host 〈DEST-HOST-IP〉] [〈ICMP-TYPE〉 |〈ICMP-CODE〉,log,rule-precedence <1-5000>]
{〈rule-description <LINE〉}}
deny dns-name [contains|exact|suffix] 〈WORD〉 (log,rule-precedence <1-5000>)
{〈rule-description <LINE〉}}
deny icmp [〈SOURCE-IP/MASK〉|〈NETWORK-GROUP-ALIAS-NAME〉|any|from-vlan 〈VLAN-ID〉|host 〈SOURCE-HOST-IP〉] [〈DEST-IP/MASK〉|〈NETWORK-GROUP-ALIAS-NAME〉|any|host 〈DEST-HOST-IP〉] (〈ICMP-TYPE〉 |〈ICMP-CODE〉,log,rule-precedence <1-5000>)
{〈rule-description <LINE〉}}
deny ip [〈SOURCE-IP/MASK〉|〈NETWORK-GROUP-ALIAS-NAME〉|any|from-vlan 〈VLAN-ID〉|host 〈SOURCE-HOST-IP〉] [〈DEST-IP/MASK〉|〈NETWORK-GROUP-ALIAS-NAME〉|any|host 〈DEST-HOST-IP〉] (log,rule-precedence <1-5000>)
{〈rule-description <LINE〉}}
deny proto [〈PROTOCOL-NUMBER〉|〈PROTOCOL-NAME〉|eigrp|gre|igmp|igp|ospf|vrrp]
[〈SOURCE-IP/MASK〉|〈NETWORK-GROUP-ALIAS-NAME〉|any|from-vlan 〈VLAN-ID〉|host 〈SOURCE-HOST-IP〉] [〈DEST-IP/MASK〉|〈NETWORK-GROUP-ALIAS-NAME〉|any|host 〈DEST-HOST-IP〉] (log,rule-precedence <1-5000>)
{〈rule-description <LINE〉}}
[eq [〈ICMP-TYPE〉 |〈ICMP-CODE〉,log,rule-precedence <1-5000>)
{〈rule-description <LINE〉}}
### Parameters


#### <NETWORK-SERVICE-ALIAS-NAME>
Applies this deny rule to packets based on service protocols and ports specified in the network-service alias
- `<NETWORK-SERVICE-ALIAS-NAME>` – Specify the network-service alias name (should be existing and configured).

A network-service alias defines service protocols and ports to match. When used with an ACL, the network-service alias defines the service-specific components of the ACL deny rule.

**Note:** For more information on configuring network-service alias, see `alias`.

#### <SOURCE-IP/MASK>
Specifies the source IP address and mask (A.B.C.D/M) to match. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified network are dropped.

#### <NETWORK-GROUP-ALIAS-NAME>
Applies a network-group alias to identify the source IP addresses. Packets, matching the service protocols and ports specified in the network-service alias, received from the addresses identified by the network-group alias are dropped.
- `<NETWORK-GROUP-ALIAS-NAME>` – Specify the network-group alias name (should be existing and configured).

A network-group alias defines a single or a range of addresses of devices, hosts, and networks. When used with an ACL, the network-group alias defines the network-specific component of the ACL rule (permit/deny).

#### any
Specifies the source as any source IP address. Packets, matching the service protocols and ports specified in the network-service alias, received from any source are dropped.

#### from-vlan <VLAN-ID>
Specifies a single VLAN or a range of VLANs as the match criteria. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified VLAN(s) are dropped.
- `<VLAN-ID>` – Specify the VLAN ID. To configure a range of VLANs, enter the start and end VLAN IDs separated by a hyphen (for example, 12-20).

**Note:** Use this option with WLANs and port ACLs.

#### host <SOURCE-HOST-IP>
Identifies a specific host (as the source to match) by its IP address. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified host are dropped.
- `<SOURCE-HOST-IP>` – Specify the source host’s exact IP address in the A.B.C.D format.

#### <DEST-IP/MASK>
Specifies the destination IP address and mask (A.B.C.D/M) to match. Packets, matching the service protocols and ports specified in the network-service alias, addressed to the specified network are dropped.

#### any
Specifies the destination as any destination IP address. Packets, matching the service protocols and ports specified in the network-service alias, addressed to any destination are dropped.

#### host <DEST-HOST-IP>
Identifies a specific host (as the destination to match) by its IP address. Packets, matching the service protocols and ports specified in the network-service alias, addressed to the specified host are dropped.
- `<DEST-HOST-IP>` – Specify the destination host’s exact IP address in the A.B.C.D format.
| **<NETWORK-GROUP-ALIAS-NAME>** | Applies a network-group alias to identify the destination IP addresses. Packets, matching the service protocols and ports specified in the network-service alias, destined for the addresses identified by the network-group alias are dropped.  
- **<NETWORK-GROUP-ALIAS-NAME>** – Specify the network-group alias name (should be existing and configured). |
| **log** | Logs all deny events matching this entry. If a source and/or destination IP address is matched (i.e. if any specified type of packet is received from a specified IP address and/or is destined for a specified IP address), an event is logged. |
| **mark [8021p <0-7>| dscp <0-63>]** | Specifies packets to mark  
- 8021p <0-7> – Marks packets by modifying 802.1.p VLAN user priority  
- dscp <0-63> – Marks packets by modifying DSCP TOS bits in the header |
| **rule-precedence <1-5000>**  
**rule-description <LINE>** | The following keywords are recursive and common to all of the above parameters:  
- rule-precedence – Assigns a precedence for this deny rule  
- <1-5000> – Specify a value from 1 - 5000.  
**Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.  
- rule-description – Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |
| **deny dns-name [contains|exact|suffix] <WORD> (log,rule-precedence <1-5000>) {<rule-description <LINE>}}** | Applies this deny rule to packets based on dns-names specified in the network-service  
- contains Matches any hostname which has this DNS label. (for example *.test.*)  
- exact Matches an exact hostname as specified in the network-service  
- suffix Matches any hostname as suffix (for example *.test)  
- <WORD> Identifies a specific host (as the source to match) by its domain name. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified host are dropped.  
- log Logs all deny events matching this dns entry. If a dns-name is matched an event is logged.  
- rule-precedence <1-5000>  
- rule-description <LINE> | The following keywords are recursive and common to all of the above parameters:  
- rule-precedence – Assigns a precedence for this deny rule  
- <1-5000> – Specify a value from 1 - 5000.  
**Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.  
- rule-description – Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |
| **deny icmp [<SOURCE-IP/MASK>|<NETWORK-GROUP-NNAME>|any|from-vlan <VLAN-ID>|host <SOURCE-HOST-IP>] [<DEST-IP/MASK>|<NETWORK-GROUP-NNAME>|any|host <DEST-HOST-IP>] (<ICMP-TYPE> <ICMP-CODE>,log,rule-precedence <1-5000>) {<rule-description <LINE>}}** | Applies this deny rule to Internet Control Message Protocol (ICMP) packets only  
- <SOURCE-IP/MASK> Specifies the source IP address and mask (A.B.C.D/M) to match. ICMP packets received from the specified sources are dropped. |
| `<NETWORK-GROUP ALIAS-NAME>` | Applies a network-group alias to identify the source IP addresses. ICMP packets received from the addresses identified by the network-group alias are dropped.  
| | • `<NETWORK-GROUP ALIAS-NAME>` – Specify the network-group alias name (should be existing and configured). |
| any | Specifies the source as any IP address. ICMP packets received from any source are dropped. |
| `from-vlan <VLAN-ID>` | Specifies a single VLAN or a range of VLANs as the match criteria. ICMP packets received from the VLANs identified here are dropped.  
| | • `<VLAN-ID>` – Specify the VLAN ID. To configure a range of VLANs, enter the start and end VLAN IDs separated by a hyphen (for example, 12-20). |
| host `<SOURCE-HOST-IP>` | Identifies a specific host (as the source to match) by its IP address. ICMP packets received from the specified host are dropped.  
| | • `<SOURCE-HOST-IP>` – Specify the source host’s exact IP address in the A.B.C.D format. |
| `<DEST-IP/MASK>` | Specifies the destination IP address and mask (A.B.C.D/M) to match. ICMP packets addressed to specified destinations are dropped. |
| `<NETWORK-GROUP ALIAS-NAME>` | Applies a network-group alias to identify the destination IP addresses. ICMP packets destined for addresses identified by the network-group alias are dropped.  
| | • `<NETWORK-GROUP ALIAS-NAME>` – Specify the network-group alias name (should be existing and configured). |
| any | Specifies the destination as any IP address. ICMP packets addressed to any destination are dropped. |
| host `<DEST-HOST-IP>` | Identifies a specific host (as the destination to match) by its IP address. ICMP packets addressed to the specified host are dropped.  
| | • `<DEST-HOST-IP>` – Specify the destination host’s exact IP address in the A.B.C.D format. |
| `<ICMP-TYPE>` | Defines the ICMP packet type  
| | For example, an ICMP type 0 indicates it is an ECHO REPLY, and type 8 indicates it is an ECHO. |
| `<ICMP-CODE>` | Defines the ICMP message type  
| | For example, an ICMP code 3 indicates “Destination Unreachable”, code 1 indicates “Host Unreachable”, and code 3 indicates “Port Unreachable.”  
| | **Note:** After specifying the source and destination IP address(es), the ICMP message type, and the ICMP code, specify the action taken in case of a match. |
| log | Logs all deny events matching this entry. If a source and/or destination IP address is matched (i.e. a ICMP packet is received from a specified IP address and/or is destined for a specified IP address), an event is logged. |
| `rule-precedence <1-5000>` | The following keywords are recursive and common to all of the above parameters:  
| | • `rule-precedence` – Assigns a precedence for this deny rule  
| | • `<1-5000>` – Specify a value from 1 - 5000.  
| | • `rule-description` – Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |
- deny ip `<SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|from-vlan `<VLAN-ID>|host `<SOURCE-HOST-IP>`| `<DEST-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|host `<DEST-HOST-IP>`] (log,rule-precedence `<1-5000>`) {<rule-description `<LINE>`}

<table>
<thead>
<tr>
<th>ip</th>
<th>Applies this deny rule to IP packets only</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;SOURCE-IP/MASK&gt;</code></td>
<td>Specifies the source IP address and mask (A.B.C.D/M) to match. IP packets received from the specified networks are dropped.</td>
</tr>
<tr>
<td><code>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</code></td>
<td>Applies a network-group alias to identify the source IP addresses. IP packets received from the addresses identified by the network-group alias are dropped.</td>
</tr>
<tr>
<td><code>any</code></td>
<td>Specifies the source as any IP address. IP packets received from any source are dropped.</td>
</tr>
<tr>
<td><code>from-vlan</code> <code>&lt;VLAN-ID&gt;</code></td>
<td>Specifies a single VLAN or a range of VLANs as the match criteria. IP packets received from the specified VLANs are dropped.</td>
</tr>
<tr>
<td><code>host </code>&lt;SOURCE-HOST-IP&gt;`</td>
<td>Identifies a specific host (as the source to match) by its IP address. IP packets received from the specified host are dropped.</td>
</tr>
<tr>
<td><code>&lt;DEST-IP/MASK&gt;</code></td>
<td>Specifies the destination IP address and mask (A.B.C.D/M) to match. IP packets addressed to the specified networks are dropped.</td>
</tr>
<tr>
<td><code>any</code></td>
<td>Specifies the destination as any IP address. IP packets addressed to any destination are dropped.</td>
</tr>
<tr>
<td><code>host </code>&lt;DEST-HOST-IP&gt;`</td>
<td>Identifies a specific host (as the destination to match) by its IP address. IP packets addressed to the specified host are dropped.</td>
</tr>
<tr>
<td><code>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</code></td>
<td>Applies a network-group alias to identify the source IP addresses. IP packets destined for addresses identified by the network-group alias are dropped.</td>
</tr>
<tr>
<td><code>log</code></td>
<td>Logs all deny events matching this entry. If a source and/or destination IP address is matched (i.e. a IP packet is received from a specified IP address and/or is destined for a specified IP address), an event is logged.</td>
</tr>
<tr>
<td><code>rule-precedence </code>&lt;1-5000&gt;`</td>
<td>The following keywords are recursive and common to all of the above parameters:</td>
</tr>
<tr>
<td><code>rule-description </code>&lt;LINE&gt;`</td>
<td><code>rule-precedence</code> – Assigns a precedence for this deny rule</td>
</tr>
<tr>
<td><code>rule-precedence </code>&lt;1-5000&gt;`</td>
<td><code>rule-precedence</code> – Specify a value from 1 - 5000.</td>
</tr>
<tr>
<td><code>rule-description </code>&lt;LINE&gt;`</td>
<td><code>rule-description</code> – Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).</td>
</tr>
</tbody>
</table>

Note:
- Use this option with WLANs and port ACLs.
• deny proto [<PROTOCOL-NUMBER>|<PROTOCOL-NAME>|eigrp|gre|igmp|igp|ospf|vrrp] [<SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|from-vlan <VLAN-ID>| host <SOURCE-HOST-IP>] [<DEST-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any| host <DEST-HOST-IP>] (log,rule-precedence <1-5000>) {(rule-description <LINE>)}

<table>
<thead>
<tr>
<th>proto</th>
<th>Configures the ACL for additional protocols Additional protocols (other than IP, ICMP, TCP, and UDP) must be configured using this parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;PROTOCOL-NUMBER&gt;</td>
<td>Filters protocols using their Internet Assigned Numbers Authority (IANA) protocol number • &lt;PROTOCOL-NUMBER&gt; – Specify the protocol number.</td>
</tr>
<tr>
<td>&lt;PROTOCOL-NAME&gt;</td>
<td>Filters protocols using their IANA protocol name • &lt;PROTOCOL-NAME&gt; – Specify the protocol name.</td>
</tr>
<tr>
<td>eigrp</td>
<td>Identifies the Enhanced Internet Gateway Routing Protocol (EIGRP) protocol (number 88) EIGRP enables routers to maintain copies of neighbors’ routing tables. Routers use this information to determine the fastest route to a destination. When a router fails to find a route in its stored route tables, it sends a query to neighbors who in turn query their neighbors till a route is found. EIGRP also enables routers to inform neighbors of changes in their routing tables.</td>
</tr>
<tr>
<td>gre</td>
<td>Identifies the General Routing Encapsulation (GRE) protocol (number 47) GRE is a tunneling protocol that enables transportation of protocols (IP, IPX, DEC net, etc.) over an IP network. GRE encapsulates the packet at the source and removes the encapsulation at the destination.</td>
</tr>
<tr>
<td>igmp</td>
<td>Identifies the Internet Group Management Protocol (IGMP) protocol (number 2) IGMP establishes and maintains multicast group memberships to interested members. Multicasting allows a networked computer to send content to multiple computers who have registered to receive the content. IGMP snooping is for listening to IGMP traffic between an IGMP host and routers in the network to maintain a map of the links that require multicast streams. Multicast traffic is filtered out for those links which do not require them.</td>
</tr>
<tr>
<td>igp</td>
<td>Identifies any private internal gateway (primarily used by CISCO for their IGRP) (number 9) IGP enables exchange of information between hosts and routers within a managed network. The most commonly used interior gateway protocol (IGP) protocols are: Routing Information Protocol (RIP) and Open Shortest Path First (OSPF)</td>
</tr>
<tr>
<td>ospf</td>
<td>Identifies the OSPF protocol (number 89) OSPF is a link-state interior gateway protocol (IGP). OSPF routes IP packets within a single routing domain (autonomous system), like an enterprise LAN. OSPF gathers link state information from neighbor routers and constructs a network topology. The topology determines the routing table presented to the Internet Layer which makes routing decisions based solely on the destination IP address found in IP packets.</td>
</tr>
<tr>
<td>vrrp</td>
<td>Identifies the Virtual Router Redundancy Protocol (VRRP) protocol (number 112) VRRP allows a pool of routers to be advertised as a single virtual router. This virtual router is configured by hosts as their default gateway. VRRP elects a master router, from this pool, and assigns it a virtual IP address. The master router routes and forwards packets to hosts on the same subnet. When the master router fails, one of the backup routers is elected as the master and its IP address is mapped to the virtual IP address.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>&lt;SOURCE-IP/MASK&gt;</code></td>
<td>Specifies the source IP address and mask (A.B.C.D/M) to match. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the specified sources are dropped.</td>
</tr>
</tbody>
</table>
| `<NETWORK-GROUP-ALIAS-NAME>`                  | Applies a network-group alias to identify the source IP addresses. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the sources defined in the network-group alias are dropped.  
  - `<NETWORK-GROUP-ALIAS-NAME>` – Specify the network-group alias name (should be existing and configured). |
| `any`                                         | Specifies the source as any IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from any source are dropped. |
| `from-vlan`                                   | Specifies a single VLAN or a range of VLANs as the match criteria. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the VLANs identified here are dropped.  
  - `<VLAN-ID>` – Specify the VLAN ID. A range of VLANs is represented by the start and end VLAN IDs separated by a hyphen (for example, 12-20).  
  - Note: Use this option with WLANs and port ACLs. |
| `host`                                        | Identifies a specific host (as the source to match) by its IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the specified host are dropped.  
  - `<SOURCE-HOST-IP>` – Specify the source host's exact IP address in the A.B.C.D format. |
| `<DEST-IP/MASK>`                              | Specifies the destination IP address and mask (A.B.C.D/M) to match. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to the specified destinations are dropped. |
| `any`                                         | Specifies the destination as any IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to any destination are dropped. |
| `host`                                        | Identifies a specific host (as the destination to match) by its IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addresses to the specified host are dropped.  
  - `<SOURCE-HOST-IP>` – Specify the destination host's exact IP address in the A.B.C.D format. |
| `<NETWORK-GROUP-ALIAS-NAME>`                  | Applies a network-group alias to identify the destination IP addresses. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to the destinations identified in the network-group alias are dropped.  
  - `<NETWORK-GROUP-ALIAS-NAME>` – Specify the network-group alias name (should be existing and configured).  
  - Note: After specifying the source and destination IP address(es), specify the action taken in case of a match. |
| `log`                                         | Logs all deny events matching this entry. If a source and/or destination IP address is matched (i.e. a packet (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) is received from a specified IP address and/or is destined for a specified IP address), an event is logged. |
| `rule-precedence`                             | The following keywords are recursive and common to all of the above parameters:  
  - `rule-precedence` – Assigns a precedence for this deny rule  
    - `<1-5000>` – Specify a value from 1 - 5000.  
  - Note: Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.  
    - `rule-description` – Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).  
    - `<LINE>` |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`deny [tcp</td>
<td>udp]`</td>
</tr>
<tr>
<td><code>&lt;SOURCE-IP/MASK&gt;</code></td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies the source IP address and mask (A.B.C.D/M) to match. TCP/UDP packets received from the specified sources are dropped.</td>
</tr>
<tr>
<td><code>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</code></td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Applies a network-group alias to identify the source IP addresses. TCP/UDP packets received from the VLANs identified here are dropped.</td>
</tr>
<tr>
<td><code>any</code></td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies the source as any IP address. TCP/UDP packets received from any source are dropped.</td>
</tr>
<tr>
<td><code>from-vlan &lt;VLAN-ID&gt;</code></td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies a single VLAN or a range of VLANs as the match criteria. TCP/UDP packets received from the VLANs identified here are dropped.</td>
</tr>
<tr>
<td><code>host &lt;SOURCE-HOST-IP&gt;</code></td>
<td>Identifies a specific host (as the source to match) by its IP address. TCP/UDP packets received from the specified host are dropped.</td>
</tr>
<tr>
<td><code>&lt;DEST-IP/MASK&gt;</code></td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Sets the destination IP address and mask (A.B.C.D/M) to match. TCP/UDP packets addressed to the specified destinations are dropped.</td>
</tr>
<tr>
<td><code>any</code></td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies the destination as any IP address. TCP/UDP packets received from any destination are dropped.</td>
</tr>
<tr>
<td><code>eq &lt;SOURCE-PORT&gt;</code></td>
<td>Identifies a specific source port. Specifies the exact source port.</td>
</tr>
<tr>
<td><code>host &lt;DEST-HOST-IP&gt;</code></td>
<td>Identifies a specific host (as the destination to match) by its IP address. TCP/UDP packets addressed to the specified host are dropped.</td>
</tr>
</tbody>
</table>

*Note:* Use this option with WLANs and port ACLs.
| **<NETWORK-GROUP-ALIAS-NAME>** | This keyword is common to the ‘tcp’ and ‘udp’ parameters. Applies a network-group alias to identify the destination IP addresses. TCP/UDP packets destined to the addresses identified in the network-group alias are dropped.  
• **<NETWORK-ALIAS-GROUP-NAME>** – Specify the network-group alias name (should be existing and configured). |
| **range** | Specifies a range of source ports  
• **<START-PORT>** – Specify the first port in the range.  
• **<END-PORT>** – Specify the last port in the range. |
| **eq** | Identifies a specific destination or protocol port to match  
• **<1-65535>** – The destination port is designated by its number  
• **<SERVICE-NAME>** – Specifies the service name  
• bgp – The designated Border Gateway Protocol (BGP) protocol port (179)  
• dns – The designated Domain Name System (DNS) protocol port (53)  
• ftp – The designated File Transfer Protocol (FTP) protocol port (21)  
• ftp-data – The designated FTP data port (20)  
• gropher – The designated GROPHER protocol port (70)  
• https – The designated HTTPS protocol port (443)  
• ldap – The designated Lightweight Directory Access Protocol (LDAP) protocol port (389)  
• nntp – The designated Network News Transfer Protocol (NNTP) protocol port (119)  
• ntp – The designated Network Time Protocol (NTP) protocol port (123)  
• pop3 – The designated POP3 protocol port (110)  
• sip – The designated Session Initiation Protocol (SIP) protocol port (5060)  
• smtp – The designated Simple Mail Transfer Protocol (SMTP) protocol port (25)  
• ssh – The designated Secure Shell (SSH) protocol port (22)  
• telnet – The designated Telnet protocol port (23)  
• tftp – The designated Trivial File Transfer Protocol (TFTP) protocol port (69)  
• www – The designated www protocol port (80) |
| **range** | Specifies a range of destination ports  
• **<START-PORT>** – Specify the first port in the range.  
• **<END-PORT>** – Specify the last port in the range. |
| **log** | Logs all deny events matching this entry. If a source and/or destination IP address or port is matched (i.e. a TCP/UDP packet is received from a specified IP address and/or is destined for a specified IP address), an event is logged. |
| **rule-precedence** | The following keywords are recursive and common to all of the above:  
• **<1-5000>** – Assigns a precedence for this deny rule  
• **<1-5000>** – Specify a value from 1 - 5000.  
**Note**: Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.  
• **rule-description** – Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |
Usage Guidelines
Use this command to deny traffic between networks/hosts based on the protocol type selected in the access list configuration. The following protocols are supported:

- IP
- ICMP
- TCP
- UDP
- PROTO (any Internet protocol other than TCP, UDP, and ICMP)

The last access control entry (ACE) in the access list is an implicit deny statement. Whenever the interface receives the packet, its content is checked against the ACEs in the ACL. It is allowed or denied based on the ACL configuration.

- Filtering TCP/UDP allows you to specify port numbers as filtering criteria
- Select ICMP as the protocol to allow or deny ICMP packets. Selecting ICMP filters ICMP packets based on ICMP type and code.

Examples
rfs7000-37FABE(config-ip-acl-test)#deny proto vrrp any any log rule-precedence 600
rfs7000-37FABE(config-ip-acl-test)#deny proto ospf any any log rule-precedence 650
rfs7000-6DCD4B(config-ip-acl-acl)#deny dns-name contains rfs7000 log rule-precedence 1
rfs7000-6DCD4B(config-ip-acl-acl)#show context
ip access-list acl
  deny dns-name contains rfs7000 log rule-precedence 1
rfs7000-6DCD4B(config-ip-acl-acl)#

rfs7000-37FABE(config-ip-acl-test)#show context
ip access-list test
  deny proto vrrp any any log rule-precedence 600
deny proto ospf any any log rule-precedence 650
rfs7000-37FABE(config-ip-acl-test)#

Using aliases in IP access list.
The following examples show the usage of network-group aliases:
rfs4000-229D58(config)#ip access-list bar
Example 1:
rfs4000-229D58(config-ip-acl-bar)#permit ip $foo any rule-precedence 10
Example 2
rfs4000-229D58(config-ip-acl-bar)#permit tcp 192.168.100.0/24 $foobar eq ftp rule-precedence 20
Example 3
rfs4000-229D58(config-ip-acl-bar)#deny ip $guest $lab rule-precedence 30
  In example 1, network-group alias $foo is used as a source
  In example 2, network-group alias $foobar is used as a destination
  In example 3, network-group aliases $guest and $lab are used as source and destination respectively.

The following examples show the usage of network-service aliases:
Example 4
rfs4000-229D58(config-ip-acl-bar)# permit $kerberos 10.60.20.0/24 $kerberos-servers log rule-precedence 40

Example 5
rfs4000-229D58(config-ip-acl-bar)# permit $Tandem 10.60.20.0/24 $Tandem-servers log rule-precedence 50

In examples 4, and 5:
- The network-service aliases ($kerberos and $Tandem) define the destination protocol-port combinations
- The source network is 10.60.20.0/24
- The destination network-address combinations are defined by the network-group aliases ($kerberos-servers and $Tandem-servers)

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a specified IP deny access rule</td>
</tr>
<tr>
<td>alias</td>
<td>Creates and configures aliases (network, VLAN, and service)</td>
</tr>
</tbody>
</table>
### 11.1.2 disable

#### ip-access-list

Disables an existing deny or permit rule without removing it from the ACL. A disabled rule is inactive and is not used to filter packets.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```plaintext
disable [deny|insert|permit]
disable [deny|insert [deny|permit]|permit] [<NETWORK-SERVICE-ALIAS-NAME>]
disable [deny|insert [deny|permit]|permit] [<NETWORK-SERVICE-ALIAS-NAME>]
disable [deny|insert [deny|permit]|permit] [<NETWORK-SERVICE-ALIAS-NAME>]
disable [deny|insert [deny|permit]|permit] [<NETWORK-SERVICE-ALIAS-NAME>]
disable [deny|insert [deny|permit]|permit] [<NETWORK-SERVICE-ALIAS-NAME>]
disable [deny|insert [deny|permit]|permit] [<NETWORK-SERVICE-ALIAS-NAME>]
disable [deny|insert [deny|permit]|permit] [<NETWORK-SERVICE-ALIAS-NAME>]
```

#### Parameters

- `disable [deny|insert|permit]` — Disables a deny or permit access rule without removing it from the ACL. This command also enables the insertion of a disable deny or permit rule without overwriting an existing rule in the IP ACL.
  
  **Note:** To disable an existing deny/permit rule, provide the exact values used to configure the deny or permit rule.

- `<NETWORK-SERVICE-ALIAS-NAME>` — Specifies the network-service alias, identified by the `<NETWORK-SERVICE-ALIAS-NAME>` keyword, associated with the deny/permit rule.

- `dns-name [contains|exact|suffix]` — Specifies the packets to reject based on the dns-name match. Applies this deny rule to packets based on dns-names specified in the network-service.

- `icmp` — Disables a rule applicable to ICMP packets only.

- `ip` — Disables a rule applicable to IP packets only.

- `proto <PROTOCOL-OPTIONS>` — Disables a rule applicable to any Internet protocol other than TCP, UDP, or ICMP packets. Identifies the Internet protocol using the options available.

- `tcp` — Disables a rule applicable to TCP packets only.

- `udp` — Disables a rule applicable to UDP packets only. **Note:** After specifying the packet type, specify the source and destination devices and network address(es) to match.

- `<SOURCE-IP/MASK>` — Specifies the source IP address and mask in the A.B.C.D/M format.
The following example shows the 'auto-tunnel-acl' settings before the disable command is executed:

```
$ rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list auto-tunnel-acl
    permit ip host 200.200.200.99 30.30.30.1/24 rule-precedence 2
    permit ip host 200.200.200.99 any rule-precedence 3
$rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#
```

The following example shows the 'auto-tunnel-acl' settings after the disable command is executed:

```
$ rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#disable permit ip host 200.200.200.99 any rule-precedence 3
$rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#
```

The following example shows the 'auto-tunnel-acl' settings after the disable command is executed:

```
$ rfs4000-229D58(config-ip-acl-test)#deny icmp any any log rule-precedence 1
```
In the following example a disable deny rule has been inserted in the IP ACL “test”:

```
rfs4000-229D58(config-ip-acl-test)#show context
ip access-list test
deny tcp from-vlan 1 any any rule-precedence 1
permit icmp any host 192.168.13.7 1 1 rule-precedence 2
rfs4000-229D58(config-ip-acl-test)#
rfs4000-229D58(config-ip-acl-test)#disable insert deny ip any any log rule-precedence 2
rfs4000-229D58(config-ip-acl-test)#show context
ip access-list test
deny tcp from-vlan 1 any any rule-precedence 1
disable deny ip any any log rule-precedence 2
permit icmp any host 192.168.13.7 1 1 rule-precedence 3
rfs4000-229D58(config-ip-acl-test)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Enables a disabled deny or permit rule</td>
</tr>
<tr>
<td><strong>deny</strong></td>
<td>Creates a new deny access rule or modifies an existing rule</td>
</tr>
<tr>
<td><strong>permit</strong></td>
<td>Creates a new permit access rule or modifies an existing rule</td>
</tr>
<tr>
<td><strong>alias</strong></td>
<td>Creates and configures a aliases (network, VLAN, and service)</td>
</tr>
</tbody>
</table>
11.1.3 insert

*ip-access-list*

Enables the insertion of a rule in an IP ACL without overwriting or replacing an existing rule having the same precedence.

The insert option allows a new rule to be inserted within an IP access list. Consider an IP ACL consisting of rules having precedences 1, 2, 3, 4, 5, and 6. You want to insert a new rule with precedence 4, without overwriting the existing precedence 4 rule. Using the insert option inserts the new rule prior to the existing one. The existing precedence 4 rule’s precedence changes to 5, and the change cascades down the list of rules within the ACL. That means rule 5 becomes rule 6, and rule 6 becomes rule 7.

**NOTE:** NOT using *insert* when creating a new rule having the same precedence as an existing rule, overwrites the existing rule.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
insert [deny|permit] <PARAMETERS> (log,mark [8021p <0-7>|dscp <0-63>],
    rule-precedence <1-5000>) {(rule-description <LINE>)}
```

**Parameters**

- *insert [deny|permit] <PARAMETERS> (log,mark [8021p <0-7>|dscp <0-63>],
  rule-precedence <1-5000>) {(rule-description <LINE>)}*

<table>
<thead>
<tr>
<th>[deny]permit</th>
<th>Inserts a deny or a permit rule within an IP ACL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;PARAMETERS&gt;</td>
<td>Provide the match criteria for this deny/permit rule. Packets will be filtered based on the criteria set here. For more information on the deny rule, see <em>deny</em>. For more information on the permit rule, see <em>permit</em>.</td>
</tr>
<tr>
<td>log</td>
<td>After specifying the match criteria, specify the action taken for filtered packets. Logs all deny/permit events matching this entry. If a source and/or destination IP address is matched an event is logged.</td>
</tr>
</tbody>
</table>
| mark [8021p <0-7]| dscp <0-63>] | Specifies packets to mark
  • 8021p <0-7> – Marks packets by modifying 802.1.p VLAN user priority
  • dscp <0-63> – Marks packets by modifying DSCP TOS bits in the header |
| rule-precedence <1-5000> | Assigns a precedence for this deny/permit rule
  • <1-5000> – Specify a value from 1 - 5000. **Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.
  • rule-description – Optional. Configures a description for this new rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |
| rule-description <LINE> | |


NOTE: The log option is functional only for router ACL’s. The log option displays an informational logging message about the packet that matches the entry sent to the console.

Examples
rfs4000-229D58(config-ip-acl-test)#deny tcp from-vlan 1 any any rule-precedence 1
rfs4000-229D58(config-ip-acl-test)#permit icmp any host 192.168.13.7 1 1 rule-precedence 2
rfs4000-229D58(config-ip-acl-test)#show context
  ip access-list test
    deny tcp from-vlan 1 any any rule-precedence 1
    permit icmp any host 192.168.13.7 1 1 rule-precedence 2
rfs4000-229D58(config-ip-acl-test)#

In the following example a new rule is inserted between the rules having precedences 1 and 2. The precedence of the existing precedence '2' rule changes to precedence 3.

rfs4000-229D58(config-ip-acl-test)#insert deny ip any any rule-precedence 2
rfs4000-229D58(config-ip-acl-test)#show context
  ip access-list test
    deny tcp from-vlan 1 any any rule-precedence 1
    deny ip any any rule-precedence 2
    permit icmp any host 192.168.13.7 1 1 rule-precedence 3
rfs4000-229D58(config-ip-acl-test)#

Related Commands

| alias          | Creates and configures aliases (network, VLAN, and service) |
11.1.4 no

ip-access-list

Removes a deny, permit, or disable rule

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [deny|disable|permit]

no [deny|permit] [<NETWORK-SERVICE-ALIAS-NAME>|dns-name|icmp|ip|proto|tcp|udp]

Parameters
- no <PARAMETERS>

Usage Guidelines
Removes an access list control entry. Provide the rule-precedence value when using the no command.

Examples
The following example shows the ACL ‘test’ settings before the ‘no’ commands are executed:

rfs7000-37FABE(config-ip-acl-test)#show context
ip access-list test
deny proto vrrp any any log rule-precedence 600
deny proto ospf any any log rule-precedence 650
rfs7000-37FABE(config-ip-acl-test)#

rfs7000-37FABE(config-ip-acl-test)#no deny proto vrrp any any rule-precedence 600
rfs7000-37FABE(config-ip-acl-test)#no deny proto ospf any any rule-precedence 650

The following example shows the ACL ‘test’ settings after the ‘no’ commands are executed:

rfs7000-37FABE(config-ip-acl-test)#show context
ip access-list test
rfs7000-37FABE(config-ip-acl-test)#
11.1.5 permit

ip-access-list

Creates a permit rule that marks packets (from a specified source IP and/or to a specified destination IP) for forwarding. You can also use this command to modify an existing permit rule.

NOTE: Use a decimal value representation to implement a permit/deny designation for a packet. The command set for IP ACLs provides the hexadecimal values for each listed EtherType. Use the decimal equivalent of the EtherType listed for any other EtherType.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

permit 

permit <NETWORK-SERVICE-ALIAS-NAME> [dns-name|icmp|ip|proto|tcp|udp] 

permit dns-name [contains|exact|suffix] <WORD> (log,rule-precedence <1-5000>) 

permit icmp [<SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|from-vlan <VLAN-ID>|host <SOURCE-HOST-IP>|<DEST-IP/MASK>|any|host <DEST-HOST-IP>] (<ICMP-TYPE> <ICMP-CODE>,log,rule-precedence <1-5000>) 

permit ip [<SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|from-vlan <VLAN-ID>|host <SOURCE-HOST-IP>|<DEST-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|host <DEST-HOST-IP>] (log,rule-precedence <1-5000>) 

permit proto [<PROTOCOL-NUMBER>|<PROTOCOL-NAME>|eigrp|gre|igmp|igp|ospf|vrrp] [dns-name|icmp|ip|proto|tcp|udp] 

permit tcp|udp [<SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|from-vlan <VLAN-ID>|host <SOURCE-HOST-IP>|<DEST-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any] 

Note: Use a decimal value representation to implement a permit/deny designation for a packet. The command set for IP ACLs provides the hexadecimal values for each listed EtherType. Use the decimal equivalent of the EtherType listed for any other EtherType.
Parameters


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| `<NETWORK-SERVICE-ALIAS-NAME>` | Applies this permit rule to packets based on service protocols and ports specified in the network-service alias  
- `<NETWORK-SERVICE-ALIAS-NAME>` – Specify the network-service alias name (should be existing and configured).  
A network-service alias defines service protocols and ports to match. When used with an ACL, the network-service alias defines the service-specific components of the ACL permit rule.  
**Note:** For more information on configuring network-service alias, see alias. |
| `<SOURCE-IP/MASK>` | Specifies the source IP address and mask (A.B.C.D/M) to match. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified network are permitted. |
| `<NETWORK-GROUP-ALIAS-NAME>` | Applies a network-group alias to identify the source IP addresses. Packets, matching the service protocols and ports specified in the network-service alias, received from the addresses identified by the network-group alias are permitted.  
- `<NETWORK-GROUP-ALIAS-NAME>` – Specify the network-group alias name (should be existing and configured).  
A network-group alias defines a single or a range of addresses of devices, hosts, and networks. When used with an ACL, the network-group alias defines the network-specific component of the ACL rule (permit/deny). |
| `any` | Specifies the source as any source IP address. Packets, matching the service protocols and ports specified in the network-service alias, received from any source are permitted. |
| `from-vlan <VLAN-ID>` | Specifies a single VLAN or a range of VLANs as the match criteria. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified VLAN(s) are permitted.  
- `<VLAN-ID>` – Specify the VLAN ID. To configure a range of VLANs, enter the start and end VLAN IDs separated by a hyphen (for example, 12-20).  
**Note:** Use this option with WLANs and port ACLs. |
| `host <SOURCE-HOST-IP>` | Identifies a specific host (as the source to match) by its IP address. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified host are permitted.  
- `<SOURCE-HOST-IP>` – Specify the source host's exact IP address in the A.B.C.D format. |
| `<DEST-IP/MASK>` | Specifies the destination IP address and mask (A.B.C.D/M) to match. Packets, matching the service protocols and ports specified in the network-service alias, addressed to the specified network are permitted. |
| `any` | Specifies the destination as any destination IP address. Packets, matching the service protocols and ports specified in the network-service alias, addressed to any destination are permitted. |
| `host <DEST-HOST-IP>` | Identifies a specific host (as the destination to match) by its IP address. Packets, matching the service protocols and ports specified in the network-service alias, addressed to the specified host are permitted.  
- `<DEST-HOST-IP>` – Specify the destination host’s exact IP address in the A.B.C.D format. |
### permit dns-name

<NETWORK-GROUP-ALIAS-NAME>

Applies a network-group alias to identify the destination IP addresses. Packets, matching the service protocols and ports specified in the network-service alias, destined for the addresses identified by the network-group alias are permitted.

- `<NETWORK-GROUP-ALIAS-NAME>` – Specify the network-group alias name (should be existing and configured).

| log         | Logs all permit events matching this entry. If a source and/or destination IP address is matched (i.e. if any specified type of packet is received from a specified IP address and/or is destined for a specified IP address), an event is logged. |
| mark [8021p <0-7> | dscp <0-63>] | Specifies packets to mark  |
|             | • 8021p <0-7> – Marks packets by modifying 802.1.p VLAN user priority  |
|             | • dscp <0-63> – Marks packets by modifying DSCP TOS bits in the header |

| rule-precedence <1-5000> rule-description <LINE> | The following keywords are recursive and common to all of the above parameters:  |
|                                                      | • rule-precedence – Assigns a precedence for this permit rule  |
|                                                      | • <1-5000> – Specify a value from 1 - 5000.  |

**Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.

- rule-description – Optional. Configures a description for this permit rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).

### permit dns-name

- `contains` [exact (mark) | suffix] `<WORD>` (log, rule-precedence `<1-5000>`)  |

- `<WORD>` | Identifies a specific host (as the source to match) by its domain name. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified host are forwarded. |

| log         | Logs all permit events matching this dns entry. If a dns-name is matched an event is logged. |
| mark [8021p <0-7> | dscp <0-63>] | Specifies packets to mark  |
|             | • 8021p <0-7> – Marks packets by modifying 802.1.p VLAN user priority  |
|             | • dscp <0-63> – Marks packets by modifying DSCP TOS bits in the header |

| rule-precedence <1-5000> rule-description <LINE> | The following keywords are recursive and common to all of the above parameters:  |
|                                                      | • rule-precedence – Assigns a precedence for this deny rule  |
|                                                      | • <1-5000> – Specify a value from 1 - 5000.  |

**Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.

- rule-description – Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).
**ACCESS-LIST 11-25**

- permit icmp [<SOURCE-IP/MASK>|<NETWORK-GROUP-NAME>|any|from-vlan <VLAN-ID>|
  host <SOURCE-HOST-IP>] [<DEST-IP/MASK>|<NETWORK-GROUP-NAME>|any|host <DEST-HOST-IP>]
  (<ICMP-TYPE> <ICMP-CODE>,log,rule-precedence <1-5000>) {((rule-description <LINE>))}

<table>
<thead>
<tr>
<th>icmp</th>
<th>Applies this permit rule to ICMP packets only</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;SOURCE-IP/MASK&gt;</td>
<td>Specifies the source IP address and mask (A.B.C.D/M) to match. ICMP packets received from the specified sources are permitted.</td>
</tr>
<tr>
<td>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</td>
<td>Applies a network-group alias to identify the source IP addresses. ICMP packets received from the addresses identified by the network-group alias are permitted.</td>
</tr>
<tr>
<td>• &lt;NETWORK-GROUP-ALIAS-NAME&gt; – Specify the network-group alias name (should be existing and configured).</td>
<td></td>
</tr>
<tr>
<td>any</td>
<td>Specifies the source as any source IP address. ICMP packets received from any source are permitted.</td>
</tr>
<tr>
<td>from-vlan &lt;VLAN-ID&gt;</td>
<td>Specifies a single VLAN or a range of VLANs as the match criteria. ICMP packets received from the VLANs identified here are permitted.</td>
</tr>
<tr>
<td>• &lt;VLAN-ID&gt; – Specify the VLAN ID. To configure a range of VLANs, enter the start and end VLAN IDs separated by a hyphen (for example, 12-20). Note: Use this option with WLANs and port ACLs.</td>
<td></td>
</tr>
<tr>
<td>host &lt;SOURCE-HOST-IP&gt;</td>
<td>Identifies a specific host (as the source to match) by its IP address. ICMP packets received from the specified host are permitted.</td>
</tr>
<tr>
<td>• &lt;SOURCE-HOST-IP&gt; – Specify the source host’s exact IP address in the A.B.C.D format.</td>
<td></td>
</tr>
<tr>
<td>&lt;DEST-IP/MASK&gt;</td>
<td>Specifies the destination IP address and mask (A.B.C.D/M) to match. ICMP packets addressed to specified destinations are permitted.</td>
</tr>
<tr>
<td>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</td>
<td>Applies a network-group alias to identify the destination IP addresses. ICMP packets destined for addresses identified by the network-group alias are permitted.</td>
</tr>
<tr>
<td>• &lt;NETWORK-GROUP-ALIAS-NAME&gt; – Specify the network-group alias name (should be existing and configured).</td>
<td></td>
</tr>
<tr>
<td>any</td>
<td>Specifies the destination as any destination IP address. ICMP packets addressed to any destination are permitted.</td>
</tr>
<tr>
<td>host &lt;DEST-HOST-IP&gt;</td>
<td>Identifies a specific host (as the destination to match) by its IP address. ICMP packets addressed to the specified host are permitted.</td>
</tr>
<tr>
<td>• &lt;DEST-HOST-IP&gt; – Specify the destination host’s exact IP address in the A.B.C.D format.</td>
<td></td>
</tr>
<tr>
<td>&lt;ICMP-TYPE&gt;</td>
<td>Defines the ICMP packet type</td>
</tr>
<tr>
<td>• For example, an ICMP type 0 indicates it is an ECHO REPLY, and type 8 indicates it is an ECHO.</td>
<td></td>
</tr>
<tr>
<td>&lt;ICMP-CODE&gt;</td>
<td>Defines the ICMP message type</td>
</tr>
<tr>
<td>• For example, an ICMP code 3 indicates “Destination Unreachable”, code 1 indicates “Host Unreachable”, and code 3 indicates “Port Unreachable.” Note: After specifying the source and destination IP address(es), the ICMP message type, and the ICMP code, specify the action taken in case of a match.</td>
<td></td>
</tr>
<tr>
<td>log</td>
<td>Logs all permit events matching this entry. If a source and/or destination IP address is matched (i.e. a ICMP packet is received from a specified IP address and/or is destined for a specified IP address), an event is logged.</td>
</tr>
<tr>
<td>rule-precedence</td>
<td>The following keywords are recursive and common to all of the above parameters:</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>&lt;1-5000&gt;</td>
<td>• rule-precedence – Assigns a precedence for this permit rule</td>
</tr>
<tr>
<td>rule-description</td>
<td>• &lt;1-5000&gt; – Specify a value from 1 - 5000.</td>
</tr>
<tr>
<td>&lt;LINE&gt;</td>
<td><strong>Note:</strong> Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.</td>
</tr>
<tr>
<td></td>
<td>• rule-description – Optional. Configures a description for this permit rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).</td>
</tr>
</tbody>
</table>

```plaintext
• permit ip [<SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|from-vlan <VLAN-ID>|host <SOURCE-HOST-IP>][<DEST-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|host <DEST-HOST-IP>]
 { log,rule-precedence <1-5000> } { (rule-description <LINE>) }
```

<table>
<thead>
<tr>
<th>ip</th>
<th>Applies this permit rule to IP packets only</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;SOURCE-IP/MASK&gt;</td>
<td>Specifies the source IP address and mask (A.B.C.D/M) to match. IP packets received from the specified networks are permitted.</td>
</tr>
<tr>
<td>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</td>
<td>Applies a network-group alias to identify the source IP addresses. IP packets received from the addresses identified by the network-group alias are permitted.</td>
</tr>
<tr>
<td></td>
<td>• &lt;NETWORK-GROUP-ALIAS-NAME&gt; – Specify the network-group alias name (should be existing and configured).</td>
</tr>
<tr>
<td>any</td>
<td>Specifies the source as any source IP address. IP packets received from any source are permitted.</td>
</tr>
<tr>
<td>from-vlan &lt;VLAN-ID&gt;</td>
<td>Specifies a single VLAN or a range of VLANs as the match criteria. IP packets received from the specified VLANs are permitted.</td>
</tr>
<tr>
<td></td>
<td>• &lt;VLAN-ID&gt; – Specify the VLAN ID. To configure a range of VLAN IDs, enter the start and end VLAN IDs separated by a hyphen (for example, 12-20).</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Use this option with WLANs and port ACLs.</td>
</tr>
<tr>
<td>host &lt;SOURCE-HOST-IP&gt;</td>
<td>Identifies a specific host (as the source to match) by its IP address. IP packets received from the specified host are permitted.</td>
</tr>
<tr>
<td></td>
<td>• &lt;SOURCE-HOST-IP&gt; – Specify the source host’s exact IP address in the A.B.C.D format.</td>
</tr>
<tr>
<td>&lt;DEST-IP/MASK&gt;</td>
<td>Specifies the destination IP address and mask (A.B.C.D/M) to match. IP packets addressed to the specified networks are permitted.</td>
</tr>
<tr>
<td>any</td>
<td>Specifies the destination as any destination IP address. IP packets addressed to any destination are permitted.</td>
</tr>
<tr>
<td>host &lt;DEST-HOST-IP&gt;</td>
<td>Identifies a specific host (as the destination to match) by its IP address. IP packets addressed to the specified host are permitted.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEST-HOST-IP&gt; – Specify the destination host’s exact IP address in the A.B.C.D format.</td>
</tr>
<tr>
<td>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</td>
<td>Applies a network-group alias to identify the destination IP addresses. IP packets destined for addresses identified by the network-group alias are permitted.</td>
</tr>
<tr>
<td></td>
<td>• &lt;NETWORK-GROUP-ALIAS-NAME&gt; – Specify the network-group alias name (should be existing and configured).</td>
</tr>
<tr>
<td>log</td>
<td>Logs all permit events matching this entry. If a source and/or destination IP address is matched (i.e. a IP packet is received from a specified IP address and/or is destined for a specified IP address), an event is logged.</td>
</tr>
<tr>
<td><strong>rule-precedence</strong>&lt;br&gt;(&lt;1\text{--}5000&gt;)&lt;br&gt;<strong>rule-description</strong>&lt;br&gt;(&lt;\text{LINE}&gt;)</td>
<td>The following keywords are recursive and common to all of the above parameters:&lt;br&gt;• <strong>rule-precedence</strong> – Assigns a precedence for this permit rule&lt;br&gt;• <strong>&lt;1\text{--}5000&gt;</strong> – Specify a value from 1 - 5000.&lt;br&gt;&lt;br&gt;<strong>Note:</strong> Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.&lt;br&gt;• <strong>rule-description</strong> – Optional. Configures a description for this permit rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>proto</strong></td>
<td>Configures the ACL for additional protocols&lt;br&gt;Additional protocols (other than IP, ICMP, TCP, and UDP) must be configured using this parameter</td>
</tr>
<tr>
<td><strong>&lt;PROTOCOL-NUMBER&gt;</strong></td>
<td>Filters protocols using their IANA protocol number&lt;br&gt;• <strong>&lt;PROTOCOL-NUMBER&gt;</strong> – Specify the protocol number.</td>
</tr>
<tr>
<td><strong>&lt;PROTOCOL-NAME&gt;</strong></td>
<td>Filters protocols using their IANA protocol name&lt;br&gt;• <strong>&lt;PROTOCOL-NAME&gt;</strong> – Specify the protocol name.</td>
</tr>
<tr>
<td><strong>eigrp</strong></td>
<td>Identifies the EIGRP protocol (number 88)&lt;br&gt;EIGRP enables routers to maintain copies of neighbors’ routing tables. Routers use this information to determine the fastest route to a destination. When a router fails to find a route in its stored route tables, it sends a query to neighbors who in turn query their neighbors till a route is found. EIGRP also enables routers to inform neighbors of changes in their routing tables.</td>
</tr>
<tr>
<td><strong>gre</strong></td>
<td>Identifies the GRE protocol (number 47)&lt;br&gt;GRE is a tunneling protocol that enables transportation of protocols (IP, IPX, DEC net, etc.) over an IP network. GRE encapsulates the packet at the source and removes the encapsulation at the destination.</td>
</tr>
<tr>
<td><strong>igmp</strong></td>
<td>Identifies the IGMP protocol (number 2)&lt;br&gt;IGMP establishes and maintains multicast group memberships to interested members. Multicasting allows a networked computer to send content to multiple computers who have registered to receive the content. IGMP snooping is for listening to IGMP traffic between an IGMP host and routers in the network to maintain a map of the links that require multicast streams. Multicast traffic is filtered out for those links which do not require them.</td>
</tr>
<tr>
<td><strong>igp</strong></td>
<td>Identifies any private internal gateway (primarily used by CISCO for their IGRP) (number 9)&lt;br&gt;IGP enables exchange of information between hosts and routers within a managed network. The most commonly used <em>interior gateway protocol</em> (IGP) protocols are: <em>Routing Information Protocol</em> (RIP) and <em>Open Shortest Path First</em> (OSPF)</td>
</tr>
<tr>
<td><strong>ospf</strong></td>
<td>Identifies the OSPF protocol (number 89)&lt;br&gt;OSPF is a link-state <em>interior gateway protocol</em> (IGP). OSPF routes IP packets within a single routing domain (autonomous system), like an enterprise LAN. OSPF gathers link state information from neighbor routers and constructs a network topology. The topology determines the routing table presented to the Internet Layer which makes routing decisions based solely on the destination IP address found in IP packets.</td>
</tr>
<tr>
<td>vrrp</td>
<td>Identifies the VRRP protocol (number 112) VRRP allows a pool of routers to be advertised as a single virtual router. This virtual router is configured by hosts as their default gateway. VRRP elects a master router, from this pool, and assigns it a virtual IP address. The master router routes and forwards packets to hosts on the same subnet. When the master router fails, one of the backup routers is elected as the master and its IP address is mapped to the virtual IP address.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>&lt;SOURCE-IP/MASK&gt;</td>
<td>Specifies the source IP address and mask (A.B.C.D/M) to match. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the specified sources are permitted.</td>
</tr>
</tbody>
</table>
| <NETWORK-GROUP-ALIAS-NAME> | Applies a network-group alias to identify the source IP addresses. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the sources defined in the network-group alias are permitted.  
  • <NETWORK-GROUP-ALIAS-NAME> – Specify the network-group alias name (should be existing and configured). |
| any | Specifies the source as any IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from any source are permitted. |
| from-vlan <VLAN-ID> | Specifies a single VLAN or a range of VLANs as the match criteria. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the VLANs identified here are permitted.  
  • <VLAN-ID> – Specify the VLAN ID. A range of VLANs is represented by the start and end VLAN IDs separated by a hyphen (for example, 12-20).  
  **Note:** Use this option with WLANs and port ACLs. |
| host <SOURCE-HOST-IP> | Identifies a specific host (as the source to match) by its IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the specified host are permitted.  
  • <SOURCE-HOST-IP> – Specify the source host’s exact IP address in the A.B.C.D format. |
| <DEST-IP/MASK> | Specifies the destination IP address and mask (A.B.C.D/M) to match. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to the specified destinations are permitted. |
| any | Specifies the destination as any destination IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to any destination are permitted. |
| host <DEST-HOST-IP> | Identifies a specific host (as the destination to match) by its IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addresses to the specified host are permitted.  
  • <SOURCE-HOST-IP> – Specify the destination host’s exact IP address in the A.B.C.D format. |
| <NETWORK-GROUP-ALIAS-NAME> | Applies a network-group alias to identify the destination IP addresses. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to the destinations identified in the network-group alias are permitted.  
  • <NETWORK-GROUP-ALIAS-NAME> – Specify the network-group alias name (should be existing and configured).  
  **Note:** After specifying the source and destination IP address(es), specify the action taken in case of a match. |
| log | Logs all deny events matching this entry. If a source and/or destination IP address is matched (i.e. a packet (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) is received from a specified IP address and/or is destined for a specified IP address), an event is logged. |
The following keywords are recursive and common to all of the above parameters:
- **rule-precedence** – Assigns a precedence for this permit rule
  - `<1-5000>` – Specify a value from 1 - 5000.

**Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.
- **rule-description** – Optional. Configures a description for this permit rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).

### Rules


#### Keywords

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcp</td>
<td>Applies this permit rule to TCP packets only</td>
</tr>
<tr>
<td>udp</td>
<td>Applies this deny rule to UDP packets only</td>
</tr>
<tr>
<td>&lt;SOURCE-IP/MASK&gt;</td>
<td>This keyword is common to the 'tcp' and 'udp' parameters. Specifies the source IP address and mask (A.B.C.D/M) to match. TCP/UDP packets received from the specified sources are permitted.</td>
</tr>
<tr>
<td>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</td>
<td>This keyword is common to the 'tcp' and 'udp' parameters. Applies a network-group alias to identify the source IP addresses. TCP/UDP packets received from the VLANs identified here are permitted.</td>
</tr>
<tr>
<td>any</td>
<td>This keyword is common to the 'tcp' and 'udp' parameters. Specifies the source as any source IP address. TCP/UDP packets received from any source are permitted.</td>
</tr>
<tr>
<td>from-vlan &lt;VLAN-ID&gt;</td>
<td>This keyword is common to the 'tcp' and 'udp' parameters. Specifies a single VLAN or a range of VLANs as the match criteria. TCP/UDP packets received from the VLANs identified here are permitted.</td>
</tr>
<tr>
<td>host &lt;SOURCE-HOST-IP&gt;</td>
<td>Identifies a specific host (as the source to match) by its IP address. TCP/UDP packets received from the specified host are permitted.</td>
</tr>
<tr>
<td>&lt;DEST-IP/MASK&gt;</td>
<td>This keyword is common to the 'tcp' and 'udp' parameters. Sets the destination IP address and mask (A.B.C.D/M) to match. TCP/UDP packets addressed to the specified destinations are permitted.</td>
</tr>
<tr>
<td>any</td>
<td>This keyword is common to the 'tcp' and 'udp' parameters. Specifies the destination as any destination IP address. TCP/UDP packets received from any destination are permitted.</td>
</tr>
<tr>
<td>eq</td>
<td>Identifies a specific source port</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>&lt;SOURCE-PORT&gt;</td>
<td>• &lt;SOURCE-PORT&gt; – Specify the exact source port.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>host</th>
<th>Identifies a specific host (as the destination to match) by its IP address. TCP/UDP packets addressed to the specified host are permitted.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;DEST-HOST-IP&gt;</td>
<td>• &lt;DEST-HOST-IP&gt; – Specify the destination host's exact IP address in the A.B.C.D format.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;NETWORK-GROUP-ALIAS-NAMESPACE&gt;</th>
<th>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Applies a network-group alias to identify the destination IP addresses. TCP/UDP packets destined to the addresses identified in the network-group alias are permitted.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;NETWORK-GROUP-ALIAS-NAMESPACE&gt; – Specify the network-group alias name (should be existing and configured).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>range</th>
<th>Specifies a range of source ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;START-PORT&gt;</td>
<td>• &lt;START-PORT&gt; – Specify the first port in the range.</td>
</tr>
<tr>
<td>&lt;END-PORT&gt;</td>
<td>• &lt;END-PORT&gt; – Specify the last port in the range.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>eq</th>
<th>Identifies a specific destination or protocol port to match</th>
</tr>
</thead>
<tbody>
<tr>
<td>[&lt;1-65535&gt;</td>
<td>• &lt;1-65535&gt; – The destination port is designated by its number</td>
</tr>
<tr>
<td>&lt;SERVICE-NAME&gt;</td>
<td>• &lt;SERVICE-NAME&gt; – Specifies the service name</td>
</tr>
<tr>
<td>ftp-data</td>
<td>• bgp – The designated Border Gateway Protocol (BGP) protocol port (179)</td>
</tr>
<tr>
<td>gropher</td>
<td>• dns – The designated Domain Name System (DNS) protocol port (53)</td>
</tr>
<tr>
<td>https</td>
<td>• ftp – The designated File Transfer Protocol (FTP) protocol port (21)</td>
</tr>
<tr>
<td>ldap</td>
<td>• ftp-data – The designated FTP data port (20)</td>
</tr>
<tr>
<td>nntp</td>
<td>• gropher – The designated GROPPER protocol port (70)</td>
</tr>
<tr>
<td>ntp</td>
<td>• https – The designated HTTPS protocol port (443)</td>
</tr>
<tr>
<td>pop3</td>
<td>• ldap – The designated Lightweight Directory Access Protocol (LDAP) protocol port (389)</td>
</tr>
<tr>
<td>sip</td>
<td>• nntp – The designated Network News Transfer Protocol (NNTP) protocol port (119)</td>
</tr>
<tr>
<td>smtp</td>
<td>• ntp – The designated Network Time Protocol (NTP) protocol port (123)</td>
</tr>
<tr>
<td>ssh</td>
<td>• pop3 – The designated POP3 protocol port (110)</td>
</tr>
<tr>
<td>telnet</td>
<td>• sip – The designated Session Initiation Protocol (SIP) protocol port (5060)</td>
</tr>
<tr>
<td>tftp</td>
<td>• smtp – The designated Simple Mail Transfer Protocol (SMTP) protocol port (25)</td>
</tr>
<tr>
<td>www</td>
<td>• ssh – The designated Secure Shell (SSH) protocol port (22)</td>
</tr>
<tr>
<td></td>
<td>• telnet – The designated Telnet protocol port (23)</td>
</tr>
<tr>
<td></td>
<td>• tftp – The designated Trivial File Transfer Protocol (TFTP) protocol port (69)</td>
</tr>
<tr>
<td></td>
<td>• www – The designated www protocol port (80)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>range</th>
<th>Specifies a range of destination ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;START-PORT&gt;</td>
<td>• &lt;START-PORT&gt; – Specify the first port in the range.</td>
</tr>
<tr>
<td>&lt;END-PORT&gt;</td>
<td>• &lt;END-PORT&gt; – Specify the last port in the range.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>log</th>
<th>Logs all permit events matching this entry. If a source and/or destination IP address or port is matched (i.e. a TCP/UDP packet is received from a specified IP address and/or is destined for a specified IP address), an event is logged.</th>
</tr>
</thead>
</table>
**Usage Guidelines**

Use this command to permit traffic between networks/hosts based on the protocol type selected in the access list. The following protocols are supported:

- IP
- ICMP
- ICP
- UDP
- PROTO (any Internet protocol other than TCP, UDP, and ICMP)

The last ACE in the access list is an implicit deny statement.

Whenever the interface receives the packet, its content is checked against all the ACEs in the ACL. The packet is allowed or denied based on the ACL configuration.

- Filtering on TCP or UDP allows you to specify port numbers as filtering criteria.
- Select ICMP to allow/deny packets. Selecting ICMP filters ICMP packets based on ICMP type and code.

**Examples**

```
rfs7000-37FABE(config-ip-acl-test)#show context
ip access-list test
rfs7000-37FABE(config-ip-acl-test)#
```

```
rfs7000-37FABE(config-ip-acl-test)#permit ip 172.16.10.0/24 any log rule-precedence 750
rfs7000-37FABE(config-ip-acl-test)#permit tcp 172.16.10.0/24 any log rule-precedence 800
```

```
rfs7000-37FABE(config-ip-acl-test)#show context
ip access-list test
  permit ip 172.16.10.0/24 any log rule-precedence 750
  permit tcp 172.16.10.0/24 any log rule-precedence 800
rfs7000-37FABE(config-ip-acl-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes a specified IP permit access rule</td>
</tr>
<tr>
<td><code>alias</code></td>
<td>Creates and configures aliases (network, VLAN, and service)</td>
</tr>
</tbody>
</table>
### 11.2 mac-access-list

*ACCESS-LIST*

The following table summarizes MAC Access list configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>deny</strong></td>
<td>Creates a new deny access rule or modifies an existing rule. A deny access rule marks packets for rejection.</td>
<td>page 11-33</td>
</tr>
<tr>
<td><strong>disable</strong></td>
<td>Disables a MAC deny or permit rule without removing it from the ACL</td>
<td>page 11-36</td>
</tr>
<tr>
<td><strong>ex3500</strong></td>
<td>Creates a MAC ACL deny and/or permit rule applicable only to the EX3500 switch</td>
<td>page 11-38</td>
</tr>
<tr>
<td><strong>insert</strong></td>
<td>Inserts a rule in a MAC ACL without overwriting or replacing an existing rule having the same precedence</td>
<td>page 11-41</td>
</tr>
<tr>
<td><strong>no</strong></td>
<td>Removes a deny and/or permit access rule from a MAC ACL</td>
<td>page 11-43</td>
</tr>
<tr>
<td><strong>permit</strong></td>
<td>Creates a new permit access rule or modifies an existing rule. A deny access rule marks packets for forwarding.</td>
<td>page 11-44</td>
</tr>
</tbody>
</table>
11.2.1 deny

mac-access-list

Creates a deny rule that marks packets (from a specified source MAC and/or to a specified destination MAC) for rejection. You can also use this command to modify an existing deny rule.

NOTE: Use a decimal value representation to implement a permit/deny designation for a packet. The command set for MAC ACLs provide the hexadecimal values for each listed EtherType. Use the decimal equivalent of the EtherType listed for any other EtherType.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

deny [<SOURCE-MAC> <SOURCE-MAC-MASK>|any|host <SOURCE-HOST-MAC>]
[<DEST-MAC> <DEST-MAC-MASK>|any|host <DEST-HOST-MAC>]
(dotp1 <0-7>, type [8021q|<1-65535>|aarp|appletalk|arp|ip|ipv6|ipx|mint|rarp|wisp],
 vlan <1-4095>, log, rule-precedence <1-5000>) { (rule-description <LINE>)}

Parameters

- deny [<SOURCE-MAC> <SOURCE-MAC-MASK>|any|host <SOURCE-HOST-MAC>]
[<DEST-MAC> <DEST-MAC-MASK>|any|host <DEST-HOST-MAC>]
(dotp1 <0-7>, type [8021q|<1-65535>|aarp|appletalk|arp|ip|ipv6|ipx|mint|rarp|wisp],
 vlan <1-4095>, log, rule-precedence <1-5000>) { (rule-description <LINE>)}

| <SOURCE-MAC> | <SOURCE-MAC-MASK> | Configures the source MAC address and mask to match
| <SOURCE-MAC> | <SOURCE-MAC-MASK> |
| any | Identifies all devices as the source to deny access. Packets received from any source are dropped.
| host | <SOURCE-HOST-MAC> | Identifies a specific host as the source to deny access
| host | <SOURCE-HOST-MAC> |<SOURCE-HOST-MAC> – Specify the source host’s exact MAC address to match. Packets received from the specified host are dropped.
| <DEST-MAC> | <DEST-MAC-MASK> | Configures the destination MAC address and mask to match
| <DEST-MAC> | <DEST-MAC-MASK> |
| any | Identifies all devices as the destination to deny access. Packets addressed to any destination are dropped.
| host | <DEST-HOST-MAC> | Identifies a specific host as the destination to deny access
| host | <DEST-HOST-MAC> | <DEST-HOST-MAC> – Specify the destination host’s exact MAC address to match. Packets addressed to the specified host are dropped.
| dotp1p <0-7> | Configures the 802.1p priority value. Sets the service classes for traffic handling
| dotp1p <0-7> | <0-7> – Specify 802.1p priority from 0 - 7.
Usage Guidelines

The deny command disallows traffic based on layer 2 (data-link layer) data. The MAC access list denies traffic from a particular source MAC address or any MAC address. It can also disallow traffic from a list of MAC addresses based on the source mask.

The MAC access list can disallow traffic based on the VLAN and EtherType.

- ARP
- WISP
- IP
- 802.1q

**NOTE:** MAC ACLs always take precedence over IP based ACLs.

The last ACE in the access list is an implicit deny statement. Whenever the interface receives the packet, its content is checked against all the ACEs in the ACL. It is allowed or denied based on the ACL's configuration.
**Examples**

rfs4000-229D58(config-mac-acl-test)#deny 41-85-45-89-66-77 ff-ff-ff-00-00-00 any vlan 1 rule-precedence 1

rfs4000-229D58(config-mac-acl-test)#deny host 00-01-ae-00-22-11 any rule-precedence 2

rfs4000-229D58(config-mac-acl-test)#show context mac access-list test
deny 41-85-45-89-66-77 FF-FF-FF-00-00-00 any vlan 1 rule-precedence 1
deny host 00-01-AE-00-22-11 any rule-precedence 2

rfs4000-229D58(config-mac-acl-test)#

The MAC ACL (in the example below) denies traffic from any source MAC address to a particular host MAC address:

rfs7000-37FABE(config-mac-acl-test)#deny any host 00:01:ae:00:22:11

The following example denies traffic between two hosts based on MAC addresses:

rfs7000-37FABE(config-mac-acl-test)#deny host 01:02:fe:45:76:89 host 01:02:89:78:78:45

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a specified MAC deny access rule</td>
</tr>
</tbody>
</table>
11.2.2 disable

Disables a MAC deny or permit rule without removing it from the ACL. A disabled rule is inactive and is not used to filter packets.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

disable [deny|insert|permit]

disable [deny|permit] [<SOURCE-MAC> <SOURCE-MAC-MASK>|any|host <SOURCE-HOST-MAC>]
[<DEST-MAC> <DEST-MAC-MASK>|any|host <DEST-HOST-MAC>] (dot1p <0-7>,
mark [8021p <0-7>|dscp <0-63>],type [8021q|<1-65535>|aarp|appletalk|arp|ip|ipv6|
ipx|mint|rarp|wisp],vlan <1-4095>) log (rule-precedence <1-5000>)
{(rule-description <LINE>)}

disable insert [deny|permit]

Parameters

- disable [deny|permit] [<SOURCE-MAC> <SOURCE-MAC-MASK>|any|host <SOURCE-HOST-MAC>]
[<DEST-MAC> <DEST-MAC-MASK>|any|host <DEST-HOST-MAC>] (dot1p <0-7>,mark [8021p <0-7>|
dscp <0-63>],type [8021q|<1-65535>|aarp|appletalk|arp|ip|ipv6|ipx|mint|rarp|wisp],vlan
<1-4095>) log (rule-precedence <1-5000>) {(rule-description <LINE>)}

| disable [deny|insert|permit] | Disables a deny, insert or permit access rule without removing it from the MAC ACL
| Note: Provide the exact values used to configure the deny or permit rule that is to be disabled. |
| <SOURCE-MAC> <SOURCE-MAC-MASK> | Specifies the source MAC address and mask to match
| • <SOURCE-MAC> – Specify the source MAC address to match.
| • <SOURCE-MAC-MASK> – Specify the source MAC address mask. |
| any | Select ‘any’ if the rule is applicable to any source MAC address |
| host <SOURCE-HOST-MAC> | Specify the source host’s exact MAC address |
| <DEST-MAC> <DEST-MAC-MASK> | Specifies the destination MAC address and mask to match
| • <DEST-MAC> – Specify the destination MAC address.
| • <DEST-MAC-MASK> – Specify the destination MAC address mask. |
| any | Select ‘any’ if the rule is applicable to any destination MAC address |
| host <DEST-HOST-MAC> | Specify the destination host’s exact MAC address |
| log | The following keyword defines the action taken when a packet matches any or all of the above specified criteria
| • log – Logs a record when a packet matches the specified criteria |
| dot1p <0-7> | Specify the 802.1p priority from 0 - 7. |
The following example shows the MAC access list ‘test’ settings before the ‘disable’ command is executed:

```
rfs4000-229D58(config-mac-acl-test)#show context
mac access-list test
deny 41-85-45-89-66-77 FF-FF-FF-00-00-00 any vlan 1 rule-precedence 1
  deny host 00-01-AE-00-22-11 any rule-precedence 2
rfs4000-229D58(config-mac-acl-test)#
```

The following example shows the MAC access list ‘test’ settings after the ‘disable’ command is executed:

```
rfs4000-229D58(config-mac-acl-test)#disable deny host 00-01-AE-00-22-11 any rule-precedence 2
rfs4000-229D58(config-mac-acl-test)#
```

### Related Commands

**no**
- Enables a disabled deny or permit rule

**deny**
- Creates a new deny access rule or modifies an existing rule

**permit**
- Creates a new permit access rule or modifies an existing rule
11.2.3 ex3500

Mac-access-list

Creates a MAC ACL deny and/or permit rule, applicable only to the EX3500 switch.

Each deny or permit rule consists of a set of match criteria and an associated action, which is deny access for the deny rule and allow access for the permit rule. When applied to layer 2 traffic (between a EX3500 switch and the WiNG managed service platform or a WiNG VM interface) every packet is matched against the configured match criteria and in case of a match the packet is dropped or forwarded depending on the rule type.

EX3500 devices (EX3524 and EX3548) are layer 2 Gigabit Ethernet switches with either 24 or 48 10/100/1000-BASE-T ports, and four SFP transceiver slots for fiber connectivity. Each 10/100/1000 Mbps port supports both the IEEE 802.3af and IEEE 802.3at-2009 PoE standards. An EX3500 switch has an SNMP-based management agent that provides both in-band and out-of-band management access. The EX3500 switch utilizes an embedded HTTP Web agent and command line interface (CLI), which in spite of being different from that of the WiNG operating system provides WiNG controllers PoE and port management resources.

NOTE: To implement the EX3500 MAC ACL rule, apply the MAC ACL directly to a EX3500 device, or to an EX35XX profile. For more information, see access-group.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

Syntax

```plaintext
ex3500 [deny|permit] [all|tagged-eth2|untagged-eth2]
ex3500 [deny|permit] [all|tagged-eth2|untagged-eth2] [any |host <SOURCE-MAC>|network <SOURCE-MAC> <SOURCE-MAC-MASK> | any |host <DEST-MAC>|network <DEST-MAC> <DEST-MAC-MASK> | ex3500-time-range <TIME-RANGE-NAME>|rule-precedence <1-128>|vlan <1-4094>|vlan-mask <1-4095>]
```

Parameters

- `ex3500 [deny|permit] [all|tagged-eth2|untagged-eth2] [any |host <SOURCE-MAC>|network <SOURCE-MAC> <SOURCE-MAC-MASK> | any |host <DEST-MAC>|network <DEST-MAC> <DEST-MAC-MASK> | ethertype <0-65535>|ethertype-mask <0-65535>|ex3500-time-range <TIME-RANGE-NAME>|rule-precedence <1-128>|vlan <1-4094>|vlan-mask <1-4095>]

| [deny|permit] | Creates a deny or permit MAC ACL rule and configures the rule parameters |
|-------------|------------------------------------------------------------------|
| Every EX3500 MAC ACL rule provides a set of match criteria against which incoming and outgoing packets (to and from an EX3500 device) are matched. In case of a match, the packet is dropped or forwarded depending on the rule type. The packet is dropped in case of a **deny** rule, and forwarded for an **permit** rule. |

| [all|tagged-eth2|untagged-eth2] | Specifies the packet type |
|----------------------|--------------------------|
| all – Applies this deny/permit rule to all packets |
| tagged-eth2 – Applies this deny/permit rule only to tagged Ethernet-2 packets |
| untagged-eth2 – Applies this deny/permit rule only to untagged Ethernet-2 packets |
| After specifying the packet type, configure the source and/or EX3500 MAC addresses to match. |
| [any| host <SOURCE-MAC>| network <SOURCE-MAC> <SOURCE-MAC-MASK>] | Enter the Source MAC addresses  
|-----------------------------------------------|----------------------------------|
| • any – Identifies all EX3500 devices as a source to match  
| • host <SOURCE-MAC> – Identifies a specific EX3500 host as the source to match  
| • <SOURCE-MAC> – Specify the source host’s exact MAC address  
| • network <SOURCE-MAC> <SOURCE-MAC-MASK> – Configures a range of MAC addresses as the source to match. Packets received from any of these MAC addresses are dropped.  
| • <SOURCE-MAC> – Specify the source MAC address to match.  
| • <SOURCE-MAC-MASK> – Specify the source MAC bit mask.  
| For a deny rule, packets received from EX3500 device(s) matching the specified MAC address(es) are dropped.  
| For a permit rule, packets received from EX3500 device(s) matching the specified MAC address(es) are forwarded. |

| [any|host <DEST-MAC>| network <DEST-MAC> <DEST-MAC-MASK>] | Enter the Destination MAC addresses  
|-----------------------------------------------|----------------------------------|
| • any – Identifies all EX3500 devices as a destination to match  
| • host <SOURCE-MAC> – Identifies a specific EX3500 host as the destination to match  
| • <SOURCE-MAC> – Specify the destination host’s exact MAC address  
| • network <SOURCE-MAC> <SOURCE-MAC-MASK> – Configures a range of MAC addresses as the destination to match. Packets addressed to any of these MAC addresses are dropped.  
| • <SOURCE-MAC> – Specify the destination MAC address to match.  
| • <SOURCE-MAC-MASK> – Specify the destination MAC bit mask.  
| For a deny rule, packets addressed to EX3500 device(s) matching the specified MAC address(es) are dropped.  
| For a permit rule, packets addressed to EX3500 device(s) matching the specified MAC address(es) are forwarded. |

| ether-type <0-65535> | Configures the Ethertype protocol number. The ether type is a two-octet field within an Ethernet frame. It indicates the protocol encapsulated in the payload of an Ethernet frame.  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;0-65535&gt; – Specify the value from 0 - 65535. The default value is 1.</td>
<td></td>
</tr>
</tbody>
</table>

| ethertype-mask <0-65535> | Configures the Ethertype mask  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;0-65535&gt; – Specify the value from 0 - 65535. The default value is 1.</td>
<td></td>
</tr>
</tbody>
</table>

| ex3500-time-range <TIME-RANGE-NAME> | Applies a specified EX3500 time range (should be existing and configured). The deny or permit rule is applied during the time period specified in the EX3500 time range.  
|-----------------------------------------------|----------------------------------|
| • <TIME-RANGE-NAME> – Specify the time range name.  
| An EX3500 time range list consists of a set of periodic and absolute time range rules. Periodic time ranges recur periodically at specified time periods, such as daily, weekly, weekends, weekdays, and on specific week days, for example on every successive Mondays. Absolute time ranges are not periodic and do not recur. They consist of a range of days during a particular time period (the starting and ending days and time are fixed).  
| **Note:** For information on configuring EX3500 time-range, see ex3500.  |

| vlan <1-4094> | Configures a VLAN ID representative of the shared SSID each user employs to interoperate within the network (once authenticated by the local RADIUS server)  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;1-4094&gt; – Specify the VLAN ID from 1 - 4094.</td>
<td></td>
</tr>
</tbody>
</table>

| vlan-mask <1-4095> | Configures the VLAN ID bit mask value  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;1-4095&gt; – Specify the VLAN bit mask from 1 - 4095.</td>
<td></td>
</tr>
</tbody>
</table>
rule-precedence <1-128>

- Configures a precedence for this EX3500 MAC ACL
- <1 - 128> – Specify a value from 1 - 128. ACLs with lower precedence are applied first to packets.

Examples

```
nx9500-6C8809(config-mac-acl-ex3500MacACL)#ex3500 deny tagged-eth2 any any vlan 20 rule-precedence 1

nx9500-6C8809(config-mac-acl-ex3500MacACL)#show context
mac access-list ex3500MacACL
  ex3500 deny tagged-eth2 any any vlan 20 rule-precedence 1
nx9500-6C8809(config-mac-acl-ex3500MacACL)#
```
11.2.4 insert

**mac-access-list**

Enables the insertion of a rule in an MAC ACL without overwriting or replacing an existing rule having the same precedence.

The insert option allows a new rule to be inserted within a MAC ACL. Consider an MAC ACL consisting of rules having precedences 1, 2, 3, 4, 5, and 6. You want to insert a new rule with precedence 4, without overwriting the existing precedence 4 rule. Using the insert option inserts the new rule prior to the existing one. The existing precedence 4 rule’s precedence changes to 5, and the change cascades down the list of rules within the ACL. That means rule 5 becomes rule 6, and rule 6 becomes rule 7.

**NOTE:** NOT using insert when creating a new rule having the same precedence as an existing rule, overwrites the existing rule.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
insert [deny|permit] <PARAMETERS> (dot1p <0-7>,mark [8021p <0-7>|dscp <0-63>],
    type [8021q|<1-65535>|aarp|appletalk|arp|ip|ipv6|ipx|mint|rarp|wisp],vlan <1-4095>,
    log,rule-precedence <1-5000>) (rule-description <LINE>)
```

**Parameters**

- `insert [deny|permit] <PARAMETERS>`
  - `dot1p <0-7>`: Configures the 802.1p priority value. Sets the service classes for traffic handling.
    - `<0-7>`: Specify 802.1p priority from 0 - 7.
  - `mark [8021p <0-7>|dscp <0-63>]`: Marks/modifies packets that match the criteria specified here.
    - `8021p <0-7>`: Modifies 802.1p VLAN user priority from 0 - 7
    - `dscp <0-63>`: Modifies DSCP TOS bits in the IP header from 0 - 63
  - `type [8021q|<1-65535>|aarp|appletalk|arp|ip|ipv6|ipx|mint|rarp|wisp]`: Specifies the type of protocol.
  - `vlan <1-4095>`: Specifies the VLAN ID.
  - `log`: Enables logging of packets that match the criteria.
  - `rule-precedence <1-5000>`: Specifies the precedence of the rule.
  - `(rule-description <LINE>)`: Provides a description for the rule.

<table>
<thead>
<tr>
<th>&lt;PARAMETERS&gt;</th>
<th>Provides a deny or permit rule within an MAC ACL</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>deny</code></td>
<td>Provide the match criteria for this deny rule. Packets will be filtered based on the criteria set here. For more information, see <code>deny</code>. For more information on the permit rule, see <code>permit</code>.</td>
</tr>
<tr>
<td><code>permit</code></td>
<td>Configures the 802.1p priority value. Sets the service classes for traffic handling. <code>&lt;0-7&gt;</code>: Specify 802.1p priority from 0 - 7.</td>
</tr>
<tr>
<td><code>dot1p &lt;0-7&gt;</code></td>
<td>Marks/modifies packets that match the criteria specified here. <code>8021p &lt;0-7&gt;</code>: Modifies 802.1p VLAN user priority from 0 - 7 <code>dscp &lt;0-63&gt;</code>: Modifies DSCP TOS bits in the IP header from 0 - 63</td>
</tr>
<tr>
<td>`mark [8021p &lt;0-7&gt;</td>
<td>dscp &lt;0-63&gt;]`</td>
</tr>
</tbody>
</table>

**Supported Platforms**

- Access Points: AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers: RFS4000, RFS6000, RFS7000
- Service Platforms: NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600
### type

<table>
<thead>
<tr>
<th>[8021q</th>
<th>&lt;1-65535&gt;</th>
<th>aarp</th>
<th>appletalk</th>
<th>arp</th>
<th>ip</th>
<th>ipv6</th>
<th>ipx</th>
<th>mint</th>
<th>rarp</th>
<th>wisp]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures the EtherType value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>An EtherType is a two-octet field in an Ethernet frame that indicates the protocol encapsulated in the payload of the frame. The EtherType values are:</td>
<td></td>
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</tr>
<tr>
<td>• 8021q – Indicates a 802.1q payload (0x8100)</td>
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</tr>
<tr>
<td>• &lt;1-65535&gt; – Indicates the EtherType protocol number</td>
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<tr>
<td>• arp – Indicates the ARP payload (0x0806)</td>
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<tr>
<td>• appletalk – Indicates the Appletalk Protocol payload (0x809B)</td>
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</tr>
<tr>
<td>• ip – Indicates the IPv4 payload (0x0800)</td>
<td></td>
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</tr>
<tr>
<td>• ipv6 – Indicates the IPv6 payload (0x86DD)</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>• ipx – Indicates the Novell's IPX payload (0x8137)</td>
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</tr>
<tr>
<td>• mint – Indicates the MiNT protocol payload (0x8783)</td>
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</tr>
<tr>
<td>• rarp – Indicates the reverse ARP payload (0x0803)</td>
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</tr>
<tr>
<td>• wisp – Indicates the WISP payload (0x8783)</td>
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</tr>
</tbody>
</table>

### vlan <1-4095>

| Configures the VLAN where the traffic is received |
| • <1-4095> – Specify the VLAN ID from 1 - 4095. |

### log

| Logs all deny/permit events matching this entry. If a source and/or destination MAC address is matched (i.e. a packet is received from a specified MAC address or is destined for a specified MAC address), an event is logged. |

### rule-precedence <1-5000>

| The following keywords are recursive and common to all of the above parameters: |
| • rule-precedence – Assigns a precedence for this deny rule |
| • <1-5000> – Specify a value from 1 - 5000. |

**Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.

| • rule-description – Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |

### Examples

rfs4000-229D58(config-mac-acl-test1)#deny 11-22-33-44-55-66 11-22-33-44-55-77 any rule-precedence 1

rfs4000-229D58(config-mac-acl-test1)#deny host B4-C7-99-6D-CD-9B any rule-precedence 2

rfs4000-229D58(config-mac-acl-test1)#show context
mac access-list test1
deny 11-22-33-44-55-66 11-22-33-44-55-77 any rule-precedence 1
deny host B4-C7-99-6D-CD-9B any rule-precedence 2
rfs4000-229D58(config-mac-acl-test1)#

In the following example a new rule is inserted between the rules having precedences 1 and 2. The precedence of the existing precedence ‘2‘ rule changes to precedence 3.

rfs4000-229D58(config-mac-acl-test1)#insert permit host B4-C7-99-6D-B5-D6 host B4-C7-99-6D-CD-9B rule-precedence 2

rfs4000-229D58(config-mac-acl-test1)#show context
mac access-list test1
deny 11-22-33-44-55-66 11-22-33-44-55-77 any rule-precedence 1

| • permit host B4-C7-99-6D-B5-D6 host B4-C7-99-6D-CD-9B rule-precedence 2 |
| • deny host B4-C7-99-6D-CD-9B any rule-precedence 3 |
| rfs4000-229D58(config-mac-acl-test1)# |
11.2.5 no

mac-access-list

Negates a command or sets its default

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [deny|disable|permit]

no [deny|permit] [<SOURCE-MAC> <SOURCE-MAC-MASK>|any|host <SOURCE-HOST-MAC>]
[<DEST-MAC> <DEST-MAC-MASK>|any|host <DEST-HOST-MAC>]
{dot1p <0-7>, mark [8021p <0-7>|dscp <0-63>], type [8021q|<1-65535>|aarp|appletalk|arp|ip|ipv6|ipx|mint|rarp|wisp], vlan <1-4095>} log (rule-precedence <1-5000>)
{(rule-description <LINE>)}

no disable [deny|permit] <RULE-PARAMETERS>

Parameters

- no <PARAMETERS>

no <PARAMETERS> Removes a deny or permit rule from the MAC ACL

Examples

rfs7000-37FABE(config-mac-acl-test)#show context
mac access-list test
  permit host 11-22-33-44-55-66 any log mark 8021p 3 rule-precedence 600
  permit host 22-33-44-55-66-77 host 11-22-33-44-55-66 type ip log rule-precedence 610
deny any host 33-44-45-56-67-78 host 11-22-33-44-55-66 type ip log rule-precedence 700

rfs7000-37FABE(config-mac-acl-test)#no deny any host 33-44-55-67-77-88 log rule-precedence 700

rfs7000-37FABE(config-mac-acl-test)#show context
mac access-list test
  permit host 11-22-33-44-55-66 any log mark 8021p 3 rule-precedence 600
  permit host 22-33-44-55-66-77 host 11-22-33-44-55-66 type ip log rule-precedence 610
## 11.2.6 permit

**mac-access-list**

Creates a permit rule that marks packets (from a specified source MAC and/or to a specified destination MAC) for forwarding. You can also use this command to modify an existing permit rule.

---

**NOTE:** Use a decimal value representation to implement a permit/deny designation for a packet. The command set for MAC ACLs provide the hexadecimal values for each listed EtherType. Use the decimal equivalent of the EtherType listed for any other EtherType.

### Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

```
permit [<SOURCE-MAC> <SOURCE-MAC-MASK>|any|host <SOURCE-HOST-MAC>] [<DEST-MAC> <DEST-MAC-MASK>|any|host <DEST-HOST-MAC>]
{dot1p <0-7>,mark [8021p <0-7>,dscp <0-63>],type [8021q|<1-65535>|aarp|appletalk|arp|ip|ipv6|ipx|mint|rarp|wisp],vlan <1-4095>}
{rule-precedence <1-5000>}[rule-description <LINE>]
```

### Parameters

- `<SOURCE-MAC>`<br>`<SOURCE-MAC-MASK>`
  - Configures the source MAC address and mask to match
  - `<SOURCE-MAC>` – Specify the source MAC address to match.
  - `<SOURCE-MAC-MASK>` – Specify the source MAC address mask.
  - Packets addressed to the specified MAC addresses are forwarded.

- `any`
  - Identifies all devices as the source to permit access. Packets addressed from any source are forwarded.

- `host <SOURCE-HOST-MAC>`
  - Identifies a specific host as the source to permit access
  - `<SOURCE-HOST-MAC>` – Specify the source host's exact MAC address to match.
  - Packets addressed to the specified host are forwarded.

- `<DEST-MAC>`<br>`<DEST-MAC-MASK>`
  - Configures the destination MAC address and mask to match
  - `<DEST-MAC>` – Specify the destination MAC address to match.
  - `<DEST-MAC-MASK>` – Specify the destination MAC address mask to match.
  - Packets addressed to the specified MAC addresses are forwarded.

- `DEST-MAC-MASK`
  - Specifies the destination MAC address mask to match

- `any`
  - Identifies all devices as the destination to permit access. Packets addressed to any destination are forwarded.

- `host <DEST-HOST-MAC>`
  - Identifies a specific host as the destination to permit access
  - `<DEST-HOST-MAC>` – Specify the destination host's exact MAC address to match.
  - Packets addressed to the specified host are forwarded.
<table>
<thead>
<tr>
<th>Keyword</th>
<th>Description</th>
</tr>
</thead>
</table>
| dotp1p <0-7> | Configures the 802.1p priority value. Sets the service classes for traffic handling.  
- <0-7> – Specify 802.1p priority from 0 - 7. |
| mark [8021p <0-7>, dscp <0-63>] | Marks/modifies packets that match the criteria specified here.  
- 8021p <0-7> – Modifies 802.1p VLAN user priority from 0 - 7  
- dscp <0-63> – Modifies DSCP TOS bits in the IP header from 0 - 63  
**Note:** This option is applicable only to the MAC ACL permit rule. |
| type [8021q]<1-65535> aarp|appletalk|arp|ipv6|ipv6x|mint|rarp|wisp] | Configures the EtherType value.  
An EtherType is a two-octet field in an Ethernet frame that indicates the protocol encapsulated in the payload of the frame. The EtherType values are:  
- 8021q – Indicates a 802.1q payload (0x8100)  
- <1-65535> – Indicates the EtherType protocol number  
- aarp – Indicates the Appletalk Address Resolution Protocol (ARP) payload (0x80F3)  
- appletalk – Indicates the Appletalk Protocol payload (0x809B)  
- arp – Indicates the ARP payload (0x0806)  
- ip – Indicates the Internet Protocol, Version 4 (IPv4) payload (0x0800)  
- ipv6 – Indicates the Internet Protocol, Version 6 (IPv6) payload (0x86DD)  
- ipx – Indicates the Novell’s IPX payload (0x8137)  
- mint – Indicates the MiNT protocol payload (0x8783)  
- rarp – Indicates the reverse Address Resolution Protocol (ARP) payload (0x0835)  
- wisp – Indicates the Wireless Internet Service Provider (WISP) payload (0x8783) |
| vlan <1-4095> | Configures the VLAN ID.  
- <1-4095> – Specify the VLAN ID from 1 - 4095. |
| log | Logs all permit events matching this entry. If a source and/or destination MAC address is matched (i.e. a packet is addressed to a specified MAC address or is destined for a specified MAC address), an event is logged. |
| rule-precedence <1-5000> | The following keywords are recursive and common to all of the above parameters:  
- rule-precedence – Assigns a precedence for this permit rule  
- <1-5000> – Specify a value from 1 - 5000.  
**Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.  
- rule-description – Optional. Configures a description for this permit rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |
Usage Guidelines
The permit command in the MAC ACL allows traffic based on layer 2 (data-link layer) information. A MAC access list permits traffic from a source MAC address or any MAC address. It also has an option to allow traffic from a list of MAC addresses (based on the source mask).

The MAC access list can be configured to allow traffic based on VLAN information, or Ethernet type. Common types include:

- ARP
- WISP
- IP
- 802.1q

Layer 2 traffic is not allowed by default. To adopt an access point through an interface, configure an ACL to allow an Ethernet WISP.

Use the mark option to specify the type of service (tos) and priority value. The tos value is marked in the IP header and the 802.1p priority value is marked in the dot1q frame.

Whenever the interface receives the packet, its content is checked against all the ACEs in the ACL. It is marked based on the ACL’s configuration.

---

**NOTE:** To apply an IP based ACL to an interface, a MAC access list entry is mandatory to allow ARP. A MAC ACL always takes precedence over IP based ACLs.

---

Examples
```
rfs7000-37FABE(config-mac-acl-test)#permit host 11-22-33-44-55-66 any log mark 8021p 3 rule-precedence 600
rfs7000-37FABE(config-mac-acl-test)#permit host 22-33-44-55-66-77 host 11-22-33-44-55-66 type ip log rule-precedence 610
rfs7000-37FABE(config-mac-acl-test)#show context
mac access-list testPF
  permit host 11-22-33-44-55-66 any log mark 8021p 3 rule-precedence 600
  permit host 22-33-44-55-66-77 host 11-22-33-44-55-66 type ip log rule-precedence 610
rfs7000-37FABE(config-mac-acl-test)#
```

Related Commands
```
no
  Removes or resets a specified MAC ACL permit rule
```
### 11.3 ipv6-access-list

**ACCESS-LIST**

Configures a IPv6 ACL

An IPv6 ACL defines a set of rules that filter IPv6 packets flowing through a port or interface. Each rule specifies the action taken when a packet matches the rule. If the action is deny, the packet is dropped. If the action is permit, the packet is allowed.

The WiNG software supports IPv6 only on VLAN interfaces. Therefore, IPv6 ACLs can be applied only on the VLAN interface.

The following table summarizes IPv6 access list configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>deny</strong></td>
<td>Creates a deny access rule or modifies an existing rule. A deny access rule rejects IPv6 packets from specified address(es) and/or destined for specified address(es).</td>
<td>page 11-48</td>
</tr>
<tr>
<td><strong>no</strong></td>
<td>Removes a deny and/or a access rule from a IPv6 ACL</td>
<td>page 11-53</td>
</tr>
<tr>
<td><strong>permit</strong></td>
<td>Creates a permit access rule or modifies an existing rule. A permit access rule accepts IPv6 packets from specified address(es) and/or destined for specified address(es).</td>
<td>page 11-54</td>
</tr>
</tbody>
</table>
11.3.1 deny

> ipv6-access-list

Creates a deny rule that rejects packets from a specified IPv6 source and/or to a specified IPv6 destination. You can also use this command to modify an existing deny rule.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
deny [icmpv6|ipv6|proto|tcp|udp]
```

```
```

```
deny ipv6 [<SOURCE-IPv6/MASK>|any|host <SOURCE-HOST-IPv6>] [<DEST-IPv6/MASK>|any|host <DEST-HOST-IPv6>] (log,rule-precedence <1-5000>) {rule-description <LINE>}
```

```
```

**Parameters**


- **deny ipv6** [ <SOURCE-IPv6/MASK> | any | host <SOURCE-HOST-IPv6> ] [ <DEST-IPv6/MASK> | any | host <DEST-HOST-IPv6> ] ( log, rule-precedence < 1-5000 > ) { rule-description < LINE > }


---

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>icmpv6</td>
<td>Applies this deny rule to ICMPv6 packets only</td>
</tr>
<tr>
<td>&lt;SOURCE-IPv6/MASK&gt;</td>
<td>Specifies a range of IPv6 source address (network) to match. ICMPv6 packets received from any source in the specified network are dropped.</td>
</tr>
<tr>
<td>any</td>
<td>Specifies the source as any IPv6 address. ICMPv6 packets received from any source are dropped.</td>
</tr>
<tr>
<td>host &lt;SOURCE-HOST-IPv6&gt;</td>
<td>Identifies a specific host (as the source to match) by its IPv6 address. ICMPv6 packets received from the specified host are dropped.</td>
</tr>
<tr>
<td>&lt;DEST-IPv6/MASK&gt;</td>
<td>Specifies a range of IPv6 destination address (network) to match. ICMPv6 packets addressed to any destination within the specified network are dropped.</td>
</tr>
<tr>
<td>any</td>
<td>Specifies the destination as any IPv6 address. ICMPv6 packets addressed to any destination are dropped.</td>
</tr>
<tr>
<td>host &lt;DEST-HOST-IPv6&gt;</td>
<td>Identifies a specific host (as the destination to match) by its IPv6 address. ICMPv6 packets addressed to the specified host are dropped.</td>
</tr>
</tbody>
</table>
### Access Control List (ACL)

#### Definitions

- **<ICMPv6-TYPE>**
  - Defines the ICMPv6 type field filter
  - *eq* – Configures a specific ICMPv6 type. Specify the ICMPv6 type value.
  - *range* – Configures a range of ICMPv6 types. Specify the starting and ending ICMPv6 type values.
  - **Note:** ICMPv6 packets with type field value matching the values specified here are dropped.

- **<ICMPv6-CODE>**
  - Defines the ICMPv6 code field filter
  - *eq* – Configures a specific ICMPv6 code. Specify the ICMPv6 code value.
  - *range* – Configures a range of ICMPv6 code. Specify the starting and ending ICMPv6 code values.
  - **Note:** ICMPv6 packets with code field value matching the values specified here are dropped.

- **log**
  - Logs all deny events matching this entry

- **rule-precedence**
  - Assigns a precedence for this deny rule
  - *<1-5000>* – Specify a value from 1 - 5000.
  - **Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.

- **rule-description**
  - Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).

- **ipv6**
  - Applies this deny rule to IPv6 packets only

- **<SOURCE-IPv6/MASK>**
  - Specifies a range of IPv6 source address (network) to match. IPv6 packets received from any source in the specified network are dropped.

- **any**
  - Specifies the source as any IPv6 address. IPv6 packets received from any source are dropped.

- **host <SOURCE-HOST-IPv6>**
  - Identifies a specific host (as the source to match) by its IPv6 address. IPv6 packets received from the specified host are dropped.

- **<DEST-IPv6/MASK>**
  - Specifies a range of IPv6 destination address (network) to match. IPv6 packets addressed to any destination within the specified network are dropped.

- **any**
  - Specifies the destination as any IPv6 address. IPv6 packets addressed to any destination are dropped.

- **host <DEST-HOST-IPv6>**
  - Identifies a specific host (as the destination to match) by its IPv6 address. IPv6 packets addressed to the specified host are dropped.

- **log**
  - Logs all deny events matching this entry

- **rule-precedence**
  - Assigns a precedence for this deny rule
  - *<1-5000>* – Specify a value from 1 - 5000
  - **Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.

#### Example

```plaintext
deny ipv6 <SOURCE-IPv6/MASK>|any|host <SOURCE-HOST-IPv6> |<DEST-IPv6/MASK>|any|host <DEST-HOST-IPv6> | (log, rule-precedence <1-5000>) { (rule-description <LINE>) }
```
### deny proto \[<PROTOCOL-NUMBER>|<PROTOCOL-NAME>|eigrp|gre|igp|ospf|vrrp\] \[<SOURCE-IPv6/MASK>|any|host <SOURCE-HOST-IPv6>|<DEST-IPv6/MASK>|any|host <DEST-HOST-IPv6>\] (log,rule-precedence \(1-5000\)) \{(rule-description \(<LINE>\))\}

<table>
<thead>
<tr>
<th><strong>rule-description</strong></th>
<th><strong>&lt;LINE&gt;</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).</td>
<td></td>
</tr>
</tbody>
</table>

- **proto**
  
  Configures the ACL for additional protocols
  
  Additional protocols (other than IP, ICMP, TCP, and UDP) must be configured using this parameter.

- **<PROTOCOL-NUMBER>**
  
  Filters protocols using their Internet Assigned Numbers Authority (IANA) protocol number
  
  - \(<PROTOCOL-NUMBER>\) – Specify the protocol number.

- **<PROTOCOL-NAME>**
  
  Filters protocols using their IANA protocol name
  
  - \(<PROTOCOL-NAME>\) – Specify the protocol name.

- **eigrp**
  
  Identifies the EIGRP protocol (number 88)
  
  EIGRP enables routers to maintain copies of neighbors’ routing tables. Routers use this information to determine the fastest route to a destination. When a router fails to find a route in its stored route tables, it sends a query to neighbors who in turn query their neighbors till a route is found. EIGRP also enables routers to inform neighbors of changes in their routing tables.

- **gre**
  
  Identifies the GRE protocol (number 47)
  
  GRE is a tunneling protocol that enables transportation of protocols (IP, IPX, DEC net, etc.) over an IP network. GRE encapsulates the packet at the source and removes the encapsulation at the destination.

- **igp**
  
  Identifies any private internal gateway (primarily used by CISCO for their IGRP) (number 9)
  
  IGP enables exchange of information between hosts and routers within a managed network. The most commonly used IGP protocols are: RIP and OSPF.

- **ospf**
  
  Identifies the OSPF protocol (number 89)
  
  OSPF is a link-state IGP. OSPF routes IP packets within a single routing domain (autonomous system), like an enterprise LAN. OSPF gathers link state information from neighbor routers and constructs a network topology. The topology determines the routing table presented to the Internet Layer which makes routing decisions based solely on the destination IP address found in IP packets.

- **vrrp**
  
  Identifies the VRRP protocol (number 112)
  
  VRRP allows a pool of routers to be advertised as a single virtual router. This virtual router is configured by hosts as their default gateway. VRRP elects a master router, from this pool, and assigns it a virtual IP address. The master router routes and forwards packets to hosts on the same subnet. When the master router fails, one of the backup routers is elected as the master and its IP address is mapped to the virtual IP address.

- **<SOURCE-IPv6/MASK>**
  
  Specifies a range of IPv6 source address (network) to match. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from any source in the specified network are dropped.

- **any**
  
  Specifies the source as any IPv6 address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from any source are dropped.
host <SOURCE-HOST-IPv6> Identifies a specific host (as the source to match) by its IPv6 address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the specified host are dropped.
  • <SOURCE-HOST-IP> – Specify the source host’s exact IPv6 address.

<DEST-IPv6/MASK> Specifies a range of IPv6 destination address (network) to match. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to any destination within the specified network are dropped.

any Specifies the destination as any IPv6 address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to any destination are dropped.

host <DEST-HOST-IPv6> Identifies a specific host (as the destination to match) by its IPv6 address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to the specified host are dropped.
  • <DEST-HOST-IP> – Specify the destination host’s exact IPv6 address.

log Logs all deny events matching this entry

rule-precedence <1-5000> Assigns a precedence for this deny rule
  • <1-5000> – Specify a value from 1 - 5000.
  Note: Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.

rule-description <LINE> Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).

• deny [tcp|udp] [<SOURCE-IPv6/MASK>|any|host <SOURCE-HOST-IPv6>] [<DEST-IPv6/MASK>|any|eq <SOURCE-PORT>|host <DEST-HOST-IPv6>|range <START-PORT> <END-PORT>]
  (log,rule-precedence <1-5000>) {rule-description <LINE>}

tcp Applies this deny rule to TCP packets only

udp Applies this deny rule to UDP packets only

<SOURCE-IPv6/MASK> This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies a range of IPv6 source address (network) to match. TCP/UDP packets received from any source in the specified network are dropped.

any This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies the source as any IPv6 address. TCP/UDP packets received from any source are dropped.

host <SOURCE-HOST-IPv6> Identifies a specific host (as the source to match) by its IPv6 address. TCP/UDP packets received from the specified host are dropped.
  • <SOURCE-HOST-IP> – Specify the source host’s exact IPv6 address.

<DEST-IPv6/MASK> This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies a range of IPv6 destination address (network) to match. TCP/UDP packets addressed to any destination within the specified network are dropped.

any This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies the destination as any IPv6 address. TCP/UDP packets received from any destination are dropped.

eq <SOURCE-PORT> Identifies a specific source port
  • <SOURCE-PORT> – Specify the exact source port.
**host**  
<DEST-HOST-IP>  
Identifies a specific host (as the destination to match) by its IPv6 address. TCP/UDP packets addressed to the specified host are dropped.  
• <DEST-HOST-IP> – Specify the destination host’s exact IP address.

**range**  
<START-PORT>  
<END-PORT>  
Specifies a range of source ports  
• <START-PORT> – Specify the first port in the range.  
• <END-PORT> – Specify the last port in the range.

**eq**  
[<1-65535>|<SERVICE-NAME>|bgp|dns|ftpd|ftp-data|gropher|https|ldap|ntpl|nntp|pop3|sip|smtp|ssh|telnet|tftp|www]  
Identifies a specific destination or protocol port to match  
• <1-65535> – The destination port is designated by its number  
• <SERVICE-NAME> – Specifies the service name  
• bgp – The designated BGP protocol port (179)  
• dns – The designated DNS protocol port (53)  
• ftp – The designated FTP protocol port (21)  
• ftp-data – The designated FTP data port (20)  
• gropher – The designated GROPER protocol port (70)  
• https – The designated HTTPS protocol port (443)  
• ldap – The designated LDAP protocol port (389)  
• nntp – The designated NNTP protocol port (119)  
• ntp – The designated NTP protocol port (123)  
• pop3 – The designated POP3 protocol port (110)  
• sip – The designated SIP protocol port (5060)  
• smtp – The designated SMTP protocol port (25)  
• ssh – The designated SSH protocol port (22)  
• telnet – The designated Telnet protocol port (23)  
• tftp – The designated TFTP protocol port (69)  
• www – The designated www protocol port (80)

**range**  
<START-PORT>  
<END-PORT>  
Specifies a range of destination ports  
• <START-PORT> – Specify the first port in the range.  
• <END-PORT> – Specify the last port in the range.

**log**  
Logs all deny events matching this entry

**rule-precedence**  
<1-5000>  
Assigns a precedence for this deny rule  
• <1-5000> – Specify a value from 1 - 5000.  
**Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.

**rule-description**  
<LINE>  
Optional. Configures a description for this deny rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).

**Examples**

```plaintext
rfs7000-6DCD4B(config-ipv6-acl-test)#deny icmpv6 any any type eq 1 code eq 0 log rule-precedence 1
rfs7000-6DCD4B(config-ipv6-acl-test)#show context ipv6 access-list test
deny icmpv6 any any type eq destination-unreachable code eq router-renumbering-command log rule-precedence 1
rfs7000-6DCD4B(config-ipv6-acl-test)#
```

**Related Commands**

**no**  
Removes a specified deny access rule
11.3.2 no

- ipv6-access-list

Removes a deny or permit rule

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [deny|permit]

no [deny|permit] [icmpv6|ipv6|proto|tcp|udp] <RULE-PARAMETERS>

Parameters
- no <PARAMETERS>

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes a deny or permit rule from the selected IPv6 access list</th>
</tr>
</thead>
</table>

Examples

The following example shows the ACL ‘test’ settings before the ‘no’ commands are executed:

```
rfs7000-6DCD4B(config-ipv6-acl-test)#show context
ipv6 access-list test
deny icmpv6 any any type eq destination-unreachable code eq router-renumbering-command log rule-precedence 1
permit proto gre any any log rule-precedence 2
```

```
rfs7000-6DCD4B(config-ipv6-acl-test)#
rfs7000-6DCD4B(config-ipv6-acl-test)#no deny icmpv6 any any type eq 1 log rule-precedence 1
```

```
rfs7000-6DCD4B(config-ipv6-acl-test)#show context
ipv6 access-list test
permit proto gre any any log rule-precedence 2
```

```
rfs7000-6DCD4B(config-ipv6-acl-test)#
```
11.3.3 permit

**ipv6-access-list**

Creates a permit rule that accepts packets from a specified IPv6 source and/or to a specified IPv6 destination. You can also use this command to modify an existing permit rule.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
permit [icmpv6|ipv6|proto|tcp|udp]

```

```
permit ipv6 [<SOURCE-IPv6/MASK>|any|host <SOURCE-HOST-IPv6>] [<DEST-IPv6/MASK>|any|host <DEST-HOST-IPv6> (<log,rule-precedence <1-5000>) {(rule-description <LINE>)
```

```
```

**Parameters**

- **icmpv6** Applies this permit rule to ICMPv6 packets only
- **<SOURCE-IPv6/MASK>** Specifies a range of IPv6 source address (network) to match. ICMPv6 packets received from any source in the specified network are accepted.
- **any** Specifies the source as any IPv6 address. ICMPv6 packets received from any source are accepted.
- **host <SOURCE-HOST-IPv6>** Identifies a specific host (as the source to match) by its IPv6 address. ICMPv6 packets received from the specified host are accepted.
  - **<SOURCE-HOST-IPv6>** – Specify the source host’s exact IPv6 address.
- **<DEST-IPv6/MASK>** Specifies a range of IPv6 destination address (network) to match. ICMPv6 packets addressed to any destination within the specified network are accepted.
- **any** Specifies the destination as any IPv6 address. ICMPv6 packets addressed to any destination are accepted.
- **host <DEST-HOST-IPv6>** Identifies a specific host (as the destination to match) by its IPv6 address. ICMPv6 packets addressed to the specified host are accepted.
  - **<DEST-HOST-IPv6>** – Specify the destination host’s exact IPv6 address.
| `<ICMPv6-TYPE>` | Defines the ICMPv6 type field filter  
| [eq\|range] | • eq – Configures a specific ICMPv6 type. Specify the ICMPv6 type value.  
| | • range – Configures a range of ICMPv6 types. Specify the starting and ending ICMPv6  
| | type values.  
| | **Note:** ICMPv6 packets with type field value matching the values specified here are  
| | forwarded.  
| `<ICMPv6-CODE>` | Defines the ICMPv6 code field filter  
| | • eq – Configures a specific ICMPv6 code. Specify the ICMPv6 code value.  
| | • range – Configures a range of ICMPv6 code. Specify the starting and ending ICMPv6  
| | code values.  
| | **Note:** ICMPv6 packets with code field value matching the values specified here are  
| | forwarded.  
| log | Logs all permit events matching this entry  
| rule-precedence | Assigns a precedence for this permit rule  
| `<1-5000>` | • `<1:5000>` – Specify a value from 1 - 5000.  
| | **Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority  
| | over a rule with precedence 10.  
| rule-description | Optional. Configures a description for this permit rule. Provide a description that uniquely  
| `<LINE>` | identifies the purpose of this rule (should not exceed 128 characters in length).  


| ipv6 | Applies this permit rule to IPv6 packets only  
| `<SOURCE-IPv6/MASK>` | Specifies a range of IPv6 source address (network) to match. IPv6 packets received from  
| | any source in the specified network are forwarded.  
| any | Specifies the source as any IPv6 address. IPv6 packets received from any source are  
| | forwarded.  
| host | Identifies a specific host (as the source to match) by its IPv6 address. IPv6 packets  
| `<SOURCE-HOST-IPv6>` | received from the specified host are forwarded.  
| | • `<SOURCE-HOST-IPv6>` – Specify the source host's exact IPv6 address.  
| `<DEST-IPv6/MASK>` | Specifies a range of IPv6 destination address (network) to match. IPv6 packets  
| | addressed to any destination within the specified network are forwarded.  
| any | Specifies the destination as any IPv6 address. IPv6 packets addressed to any destination  
| | are forwarded.  
| host | Identifies a specific host (as the destination to match) by its IPv6 address. IPv6 packets  
| `<DEST-HOST-IPv6>` | addressed to the specified host are forwarded.  
| | • `<DEST-HOST-IPv6>` – Specify the destination host's exact IPv6 address.  
| log | Logs all permit events matching this entry  
| rule-precedence | Assigns a precedence for this permit rule  
| `<1-5000>` | • `<1:5000>` – Specify a value from 1 - 5000  
| | **Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority  
| | over a rule with precedence 10.
### permit proto

```
permit proto [<PROTOCOL-NUMBER>|<PROTOCOL-NAME>|eigrp|gre|igp|ospf|vrrp] [<SOURCE-IPv6/MASK>|any] [host <SOURCE-HOST-IPv6>] [ <DEST-IPv6/MASK>|any] [host <DEST-HOST-IPv6>] { (log,rule-precedence <1-5000>) { (rule-description <LINE>) }
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>rule-description</code></td>
<td>Optional. Configures a description for this permit rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length).</td>
</tr>
<tr>
<td><code>&lt;LINE&gt;</code></td>
<td></td>
</tr>
<tr>
<td><code>proto</code></td>
<td>Configures the ACL for additional protocols. Additional protocols (other than IP, ICMP, TCP, and UDP) must be configured using this parameter.</td>
</tr>
<tr>
<td><code>&lt;PROTOCOL-NUMBER&gt;</code></td>
<td>Filters protocols using their Internet Assigned Numbers Authority (IANA) protocol number. <code>&lt;PROTOCOL-NUMBER&gt;</code> – Specify the protocol number.</td>
</tr>
<tr>
<td><code>&lt;PROTOCOL-NAME&gt;</code></td>
<td>Filters protocols using their IANA protocol name. <code>&lt;PROTOCOL-NAME&gt;</code> – Specify the protocol name.</td>
</tr>
<tr>
<td><code>eigrp</code></td>
<td>Identifies the EIGRP protocol (number 88). EIGRP enables routers to maintain copies of neighbors’ routing tables. Routers use this information to determine the fastest route to a destination. When a router fails to find a route in its stored route tables, it sends a query to neighbors who in turn query their neighbors till a route is found. EIGRP also enables routers to inform neighbors of changes in their routing tables.</td>
</tr>
<tr>
<td><code>gre</code></td>
<td>Identifies the GRE protocol (number 47). GRE is a tunneling protocol that enables transportation of protocols (IP, IPX, DEC net, etc.) over an IP network. GRE encapsulates the packet at the source and removes the encapsulation at the destination.</td>
</tr>
<tr>
<td><code>igp</code></td>
<td>Identifies any private internal gateway (primarily used by CISCO for their IGRP) (number 9). IGP enables exchange of information between hosts and routers within a managed network. The most commonly used IGP protocols are: RIP and OSPF.</td>
</tr>
<tr>
<td><code>ospf</code></td>
<td>Identifies the OSPF protocol (number 89). OSPF is a link-state IGP. OSPF routes IP packets within a single routing domain (autonomous system), like an enterprise LAN. OSPF gathers link state information from neighbor routers and constructs a network topology. The topology determines the routing table presented to the Internet Layer which makes routing decisions based solely on the destination IP address found in IP packets.</td>
</tr>
<tr>
<td><code>vrrp</code></td>
<td>Identifies the VRRP protocol (number 112). VRRP allows a pool of routers to be advertised as a single virtual router. This virtual router is configured by hosts as their default gateway. VRRP elects a master router, from this pool, and assigns it a virtual IP address. The master router routes and forwards packets to hosts on the same subnet. When the master router fails, one of the backup routers is elected as the master and its IP address is mapped to the virtual IP address.</td>
</tr>
<tr>
<td><code>&lt;SOURCE-IPv6/MASK&gt;</code></td>
<td>Specifies a range of IPv6 source address (network) to match. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from any source in the specified network are forwarded.</td>
</tr>
<tr>
<td><code>any</code></td>
<td>Specifies the source as any IPv6 address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from any source are forwarded.</td>
</tr>
<tr>
<td>Access-List Syntax</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| host `<SOURCE-HOST-IPv6>` | Identifies a specific host (as the source to match) by its IPv6 address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the specified host are forwarded.  
  - `<SOURCE-HOST-IPv6>` – Specify the source host’s exact IPv6 address. |
| `<DEST-IPv6/MASK>` | Specifies a range of IPv6 destination address (network) to match. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to any destination within the specified network are forwarded. |
| any | Specifies the destination as any IPv6 address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to any destination are forwarded. |
| host `<DEST-HOST-IPv6>` | Identifies a specific host (as the destination to match) by its IPv6 address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to the specified host are forwarded.  
  - `<DEST-HOST-IPv6>` – Specify the destination host’s exact IPv6 address. |
| log | Logs all permit events matching this entry |
| rule-precedence `<1-5000>` | Assigns a precedence for this permit rule  
  - `<1-5000>` – Specify a value from 1 - 5000.  
  **Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10. |
| rule-description `<LINE>` | Optional. Configures a description for this permit rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |
| `permit [tcp|udp] [<SOURCE-IPv6/MASK>|any|host `<SOURCE-HOST-IPv6>`] [<DEST-IPv6/MASK>|any|eq `<SOURCE-PORT>`|host `<DEST-HOST-IPv6>`|range `<START-PORT>` `<END-PORT>`]` | Applies this permit rule to TCP packets only |
| `log,rule-precedence `<1-5000>` | Logs all permit events matching this entry |
| `rule-description `<LINE>` | Optional. Configures a description for this permit rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |
| `tcp` | Applies this permit rule to TCP packets only |
| (log,rule-precedence `<1-5000>` | Logs all permit events matching this entry |
| `rule-description `<LINE>` | Optional. Configures a description for this permit rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |
| `udp` | Applies this permit rule to UDP packets only |
| `<SOURCE-IPv6/MASK>` | This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies a range of IPv6 source address (network) to match. TCP/UDP packets received from any source in the specified network are forwarded. |
| any | This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies the source as any IPv6 address. TCP/UDP packets received from any source are forwarded. |
| host `<SOURCE-HOST-IPv6>` | Identifies a specific host (as the source to match) by its IPv6 address. TCP/UDP packets received from the specified host are forwarded.  
  - `<SOURCE-HOST-IPv6>` – Specify the source host’s exact IPv6 address. |
| `<DEST-IPv6/MASK>` | This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies a range of IPv6 destination address (network) to match. TCP/UDP packets addressed to any destination within the specified network are forwarded. |
| any | This keyword is common to the ‘tcp’ and ‘udp’ parameters. Specifies the destination as any destination IPv6 address. TCP/UDP packets received from any destination are forwarded. |
| eq `<SOURCE-PORT>` | Identifies a specific source port  
  - `<SOURCE-PORT>` – Specify the exact source port. |
**Examples**

rfs7000-6DCD4B(config-ipv6-acl-test)#permit proto gre any any log rule-precedence 2

rfs7000-6DCD4B(config-ipv6-acl-test)#show context ipv6 access-list test
deny icmpv6 any any type eq destination-unreachable code eq router-renumbering-command log rule-precedence 1

rfs7000-6DCD4B(config-ipv6-acl-test)#permit proto gre any any log rule-precedence 2

rfs7000-6DCD4B(config-ipv6-acl-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a specified permit access rule</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| host        | Identifies a specific host (as the destination to match) by its IPv6 address. TCP/UDP packets addressed to the specified host are forwarded.  
- <DEST-HOST-IPv6> – Specify the destination host’s exact IP address. |
| range       | Specifies a range of source ports  
- <START-PORT> – Specify the first port in the range.  
- <END-PORT> – Specify the last port in the range. |
| eq          | Identifies a specific destination or protocol port to match  
- [<1-65535>] – The destination port is designated by its number  
- <SERVICE-NAME> – Specifies the service name  
- bgp – The designated BGP protocol port (179)  
- dns – The designated DNS protocol port (53)  
- ftp – The designated FTP protocol port (21)  
- ftp-data – The designated FTP data port (20)  
- gropher – The designated GROPHER protocol port (70)  
- https – The designated HTTPS protocol port (443)  
- ldap – The designated LDAP protocol port (389)  
- nntp – The designated NNTP protocol port (119)  
- ntp – The designated NTP protocol port (123)  
- pop3 – The designated POP3 protocol port (110)  
- sip – The designated SIP protocol port (5060)  
- smtp – The designated SMTP protocol port (25)  
- ssh – The designated SSH protocol port (22)  
- telnet – The designated Telnet protocol port (23)  
- tftp – The designated TFTP protocol port (69)  
- www – The designated www protocol port (80) |
| range       | Specifies a range of destination ports  
- <START-PORT> – Specify the first port in the range.  
- <END-PORT> – Specify the last port in the range. |
| log         | Logs all permit events matching this entry |
| rule-precedence | Assigns a precedence for this permit rule  
- [<1-5000>] – Specify a value from 1 - 5000.  
**Note:** Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10. |
| rule-description | Optional. Configures a description for this permit rule. Provide a description that uniquely identifies the purpose of this rule (should not exceed 128 characters in length). |
11.4 ip-snmp-access-list

SNMP performs network management functions using a data structure called a Management Information Base (MIB). SNMP is widely implemented but not very secure, since it uses only text community strings for accessing controller or service platform configuration files.

Use SNMP ACLs to help reduce SNMP’s vulnerabilities, as SNMP traffic can be exploited to produce a denial of service (DoS).

The following table summarizes SNMP access list configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny</td>
<td>Creates a deny SNMP MIB object traffic rule</td>
<td>page 11-60</td>
</tr>
<tr>
<td>permit</td>
<td>Creates a permit SNMP MIB object traffic rule</td>
<td>page 11-61</td>
</tr>
<tr>
<td>no</td>
<td>Removes a deny or permit SNMP MIB object traffic rule</td>
<td>page 11-62</td>
</tr>
</tbody>
</table>
11.4.1 deny

`ip-snmp-access-list`

Creates a deny SNMP MIB object traffic rule. Use this command to specify the match criteria based on which SNMP traffic is denied.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

deny [<IP/M>|any|host <IP>]

Parameters

- deny [<IP/M>|any|host <IP>]

| deny [<IP/M]|any|host <IP>] | Configures the match criteria for this deny rule |
|-----------------|-----------------------------------------------|
| • <IP/M> – Specifies a network address and mask in the A.B.C.D/M format. Packets received or destined for this network are dropped |
| • any – Specifies the match criteria as any. Packets received or destined from any address are dropped |
| • host <IP> – Identifies a host by its IP address. Packets received or destined for this host are dropped |

Examples

rfs7000-6DCD4B(config-ip-snmp-acl-test)#deny 192.168.13.0/24
rfs7000-6DCD4B(config-ip-snmp-acl-test)#show context
ip snmp-access-list test
deny 192.168.13.0/24
rfs7000-6DCD4B(config-ip-snmp-acl-test)#

Related Commands

`no` Removes this deny rule form the IP SNMP ACL
11.4.2 permit

ip-snmp-access-list

Creates a permit SNMP MIB object traffic rule. Use this command to specify the match criteria based on which SNMP traffic is permitted.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`permit [<IP/M>|any|host <IP>]`

Parameters

- `<IP/M>` – Specifies a network address and mask in the A.B.C.D/M format. Packets received or destined for this network are forwarded
- `any` – Specifies the match criteria as any. Packets received or destined from any address are forwarded
- `host <IP>` – Identifies a host by its IP address. Packets received or destined for this host are forwarded

Examples

```bash
rfs7000-6DCD4B(config-ip-snmp-acl-test)#permit host 192.168.13.13
rfs7000-6DCD4B(config-ip-snmp-acl-test)#show context
  ip snmp-access-list test
    permit host 192.168.13.13
deny 192.168.13.0/24
rfs7000-6DCD4B(config-ip-snmp-acl-test)#
```

Related Commands

- `no` Removes this permit rule from the IP SNMP ACL
11.4.3 no

ip-snmp-access-list

Removes a deny or permit rule from the IP SNMP ACL. Use this command to remove IP SNMP ACL as they become obsolete for filtering network access permissions.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [deny|permit] [<IP/M>|any|host <IP>]

Parameters

- no <PARAMETERS>

no <PARAMETERS> Removes deny and/or permit access rule from this IP SNMP ACL

Examples

rfs7000-6DCD4B(config-ip-snmp-acl-test)#show context
ip snmp-access-list test
  permit host 192.168.13.13
  deny 192.168.13.0/24
rfs7000-6DCD4B(config-ip-snmp-acl-test)#

rfs7000-6DCD4B(config-ip-snmp-acl-test)#no permit host 192.168.13.13

rfs7000-6DCD4B(config-ip-snmp-acl-test)#show context
ip snmp-access-list test
  deny 192.168.13.0/24
rfs7000-6DCD4B(config-ip-snmp-acl-test)#
11.5 ex3500-ext-access-list

IP ACLs function as firewalls that filter or mark packets on layer 3 ports as opposed to MAC ACLs that filter traffic on layer 2 ports.

An IPv4 EX3500 extended ACL is a policy-based ACL that either prevents or allows specific clients from using the EX3500 switch. It allows you to permit or deny client access by specifying that the traffic from a specific host or network and/or the traffic to a specific host or network be either denied or permitted.

An EX3500 extended ACL consists of a set of deny /permit rules that filter packets based on both source and destination IPv4 addresses. Each rule specifies a set of match criteria (the source and destination IP addresses) and has a unique precedence value assigned. These ACL rules are applied sequentially to the traffic at a port, by a firewall-supported device, in an increasing order of their precedence. When a packet matches the criteria specified in a rule the packet is either forwarded or dropped based on the rule type.

The following table summarizes IPv4 EX3500 extended ACL configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny</td>
<td>Creates a deny access rule or modifies an existing rule. A deny access rule rejects packets from specified address(es) and/or destined to specified address(es).</td>
<td>page 11-64</td>
</tr>
<tr>
<td>permit</td>
<td>Creates a permit access rule or modifies an existing rule. A permit access rule accepts packets from specified address(es) and/or destined to specified address(es).</td>
<td>page 11-67</td>
</tr>
<tr>
<td>no</td>
<td>Removes a deny and/or a permit access rule from this IPv4 EX3500 extended ACL</td>
<td>page 11-70</td>
</tr>
</tbody>
</table>

NOTE: To implement the EX3500 extended ACL, apply it directly to a EX3500 device, or to an EX35XX profile. For more information, see access-group.
11.5.1 deny

Creates a deny ACL rule that filters packets based on the source and/or destination IPv4 address, and other specified criteria. You can also use this command to modify an existing deny rule.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

Syntax

deny [0-255] tcp|udp] [<SOURCE-NETWORK-IP/MASK>|any|host <SOURCE-HOST-IP>] [destination-port <0-65535>|destination-port-bitmark <0-65535>|dscp <0-63>|ex3500-time-range <TIME-RANGE-NAME>|ip-precedence <0-63>|rule-precedence <1-128>|source-port <0-65535>|source-port-bitmark <0-65535>]

Parameters
- deny [0-255] tcp|udp] [0-255] – Identifies the protocol from its number. Specify the protocol number from 0 - 255.
- tcp – Configures the protocol as TCP
- udp – Configures the protocol as UDP

- <source-NETWORK-IP/MASK> – Configures a network as the source. Provide the network’s IPv4 address along with the mask.
- host <source-HOST-IP> – Configures a single device as the source. Provide the host device’s IPv4 address.
- any – Specifies that the source can be any device

- destination-port <0-65535> – Configures the port number as the destination. Provide the network’s IPv4 address along with the mask
- host <destination-HOST-IP> – Configures a single device as the destination. Provide the host device’s IPv4 address.
- any – Specifies that the destination can be any device

- control-flag <0-63> – Configures the decimal number (representing a bit string) that specifies the control flag bits in byte 14 of the TCP header.
- <0-63> – Specify a value from 0 - 63.

Note: Control flags can be used only in ACLs designed to filter TCP traffic. The TCP header contains several one-bit boolean fields known as flags that influence flow of data across a TCP connection. Ignoring the CWR and ECE flags added for congestion notification by RFC 3168, there are six TCP control flags.
- URG flag - Marks incoming packet as urgent.

Contd...
Usage Guidelines
Use this command to deny traffic between networks/hosts based on the protocol type selected in the access list configuration. The following protocols are supported:

- TCP
- UDP
- <0-255> (any Internet protocol other than TCP, UDP, and ICMP)

Whenever the interface receives the packet, its content is checked against the ACEs in the ACL. It is allowed or denied based on the ACL configuration.

- Filtering TCP/UDP allows you to specify port numbers as filtering criteria
Examples
The following example denies TCP outgoing packets from all sources within the 192.168.14.0 network to a specific host 192.168.13.13:

```
rule-precedence 1#
```

```
nx9500-6C8809(config-ip-ex3500-ext-acl-test)#show context
ip ex3500-ext-access-list test
  deny tcp 192.168.14.0/24 host 192.168.13.13 rule-precedence 1
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a specified deny access rule from this IPv4 EX3500 extended ACL</td>
</tr>
</tbody>
</table>
11.5.2 permit

ex3500-ext-access-list

Creates a permit ACL rule that filters packets based on the source and/or destination IPv4 address, and other specified criteria. You can also use this command to modify an existing permit rule.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

Syntax

\[
\text{permit } [\langle 0-255 \rangle | \text{tcp} | \text{udp}] \ [\langle \text{SOURCE-NETWORK-IP/MASK} \rangle | \text{any} | \text{host } \langle \text{SOURCE-HOST-IP} \rangle ] \\
\langle \text{DEST-NETWORK-IP/MASK} \rangle | \text{any} | \text{host } \langle \text{DEST-HOST-IP} \rangle ] \ [\text{control-flag } <0-63>] \\
\text{destination-port } <0-65535> \ [\text{destination-port-bitmark } <0-65535>] \ [\text{dscp } <0-63>] \\
ex3500-time-range <\text{TIME-RANGE-NAME}> \ [\text{ip-precedence } <0-63>] \ [\text{rule-precedence } 1-128] \\
\text{source-port } <0-65535> \ [\text{source-port-bitmark } <0-65535>]
\]

Parameters

- permit [\langle 0-255 \rangle | \text{tcp} | \text{udp}] [\langle \text{SOURCE-NETWORK-IP/MASK} \rangle | \text{any} | \text{host } \langle \text{SOURCE-HOST-IP} \rangle ] \\
\langle \text{DEST-NETWORK-IP/MASK} \rangle | \text{any} | \text{host } \langle \text{DEST-HOST-IP} \rangle ] \ [\text{control-flag } <0-63>] \\
\text{destination-port } <0-65535> \ [\text{destination-port-bitmark } <0-65535>] \ [\text{dscp } <0-63>] \\
ex3500-time-range <\text{TIME-RANGE-NAME}> \ [\text{ip-precedence } <0-63>] \ [\text{rule-precedence } 1-128] \\
\text{source-port } <0-65535> \ [\text{source-port-bitmark } <0-65535>]

| permit [\langle 0-255 \rangle | \text{tcp} | \text{udp}] | Creates a permit rule and identifies the protocol type. This permit rule is applied only to packets matching the protocol specified here. |
| --- | --- |
| • \langle 0-255 \rangle – Identifies the protocol from its number. Specify the protocol number from 0 - 255. |
| • tcp – Configures the protocol as TCP |
| • udp – Configures the protocol as UDP |

| \[\langle \text{SOURCE-NETWORK-IP/MASK} \rangle | \text{any} | \text{host } \langle \text{SOURCE-HOST-IP} \rangle ] | Specifies the source IP address as any, host, or network. |
| --- | --- |
| • \langle \text{SOURCE-NETWORK-IP/MASK} \rangle – Configures a network as the source. Provide the network’s IPv4 address along with the mask. |
| • host \langle \text{SOURCE-HOST-IP} \rangle – Configures a single device as the source. Provide the host device’s IPv4 address. |
| • any – Specifies that the source can be any device |

| \[\langle \text{DEST-NETWORK-IP/MASK} \rangle | \text{any} | \text{host } \langle \text{DEST-HOST-IP} \rangle ] | Specifies the destination IP address as any, host, or network. |
| --- | --- |
| • \langle \text{DEST-NETWORK-IP/MASK} \rangle – Configures a network as the destination. Provide the network’s IPv4 address along with the mask. |
| • host \langle \text{DEST-HOST-IP} \rangle – Configures a single device as the destination. Provide the host device’s IPv4 address. |
| • any – Specifies that the destination can be any device |

<table>
<thead>
<tr>
<th>control-flag &lt;0-63&gt;</th>
<th>Configures the decimal number (representing a bit string) that specifies the control flag bits in byte 14 of the TCP header</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;0-63&gt; – Specify a value from 0 - 63.</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Control flags can be used only in ACLs designed to filter TCP traffic. The TCP header contains several one-bit boolean fields known as flags that influence flow of data across a TCP connection. Ignoring the CWR and ECE flags added for congestion notification by RFC 3168, there are six TCP control flags.
- URG flag - Marks incoming packet as urgent.
Contd...
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Usage Guidelines

Use this command to permit traffic between networks/hosts based on the protocol type selected in the access list configuration. The following protocols are supported:

- TCP
- UDP
- <0-255> (any Internet protocol other than TCP, UDP, and ICMP)

Whenever the interface receives the packet, its content is checked against the ACEs in the ACL. It is allowed or denied based on the ACL configuration.

- Filtering TCP/UDP allows you to specify port numbers as filtering criteria.
Examples
The following example permits outgoing TCP packets from all sources within the 192.168.14.0 network to any destination, with the TCP control flag set to 16 (acknowledge):

```
nx9500-6C8809(config-ip-ex3500-ext-acl-test)#permit tcp 192.168.14.0/24 any control-flag 16 rule-precedence 2
```

```
nx9500-6C8809(config-ip-ex3500-ext-acl-test)#show context ip ex3500-ext-access-list test
deny tcp 192.168.14.0/24 host 192.168.13.13 rule-precedence 1
permit tcp 192.168.14.0/24 any control-flag 16 rule-precedence 2
```

nx9500-6C8809(config-ip-ex3500-ext-acl-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a specified permit access rule from this IPv4 EX3500 extended ACL</td>
</tr>
</tbody>
</table>
11.5.3 no

- **ex3500-ext-access-list**

Removes a deny or permit access rule from this IPv4 EX3500 extended ACL

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

**Syntax**

no [deny|permit] [<0-255>|tcp|udp] [<SOURCE-NETWORK-IP/MASK>|any|host <SOURCE-HOST-IP>]
[<DEST-NETWORK-IP/MASK>|any|host <DEST-HOST-IP>] [control-flag <0-63>]
destination-port <0-65535>|destination-port-bitmark <0-65535>|dscp <0-63>
ex3500-time-range <TIME-RANGE-NAME>|ip-precedence <0-63>|rule-precedence <1-128>
source-port <0-65535>|source-port-bitmark <0-65535]

**Parameters**
- no <PARAMETERS>

**Usage Guidelines**

The keyword ‘control-flag <0-63>’ is only applicable to ACL rules filtering TCP traffic.

**Examples**

The following example shows the IPv4 EX3500 extended ACL ‘test’ settings before the ‘no’ commands are executed:

```
nx9500-6C8809(config-ip-ex3500-ext-acl-test)#show context
ip ex3500-ext-access-list test
deny tcp 192.168.14.0/24 host 192.168.13.13 rule-precedence 1
permit tcp 192.168.14.0/24 any control-flag 16 rule-precedence 2
nx9500-6C8809(config-ip-ex3500-ext-acl-test)#
```

The following example shows the IPv4 EX3500 extended ACL ‘test’ settings after the ‘no’ commands are executed:

```
nx9500-6C8809(config-ip-ex3500-ext-acl-test)#no permit tcp 192.168.14.0/24 any control-flag 16 rule-precedence 2
```

The following example shows the IPv4 EX3500 extended ACL ‘test’ settings after the ‘no’ commands are executed:

```
nx9500-6C8809(config-ip-ex3500-ext-acl-test)#show context
ip ex3500-ext-access-list test
deny tcp 192.168.14.0/24 host 192.168.13.13 rule-precedence 1
nx9500-6C8809(config-ip-ex3500-ext-acl-test)#
```
11.6 ex3500-std-access-list

A EX3500 standard ACL is a policy-based ACL that contains a set of filter criteria and action that is applied to traffic originating from a specified source.

The following table summarizes IPv4 EX3500 standard ACL configuration commands:

### NOTE:
To implement the EX3500 standard ACL, apply it directly to a EX3500 device, or to an EX35XX profile. For more information, see access-group.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny</td>
<td>Creates a deny rule that rejects packets from a specified source or sources. The source can be a single device or a range of devices within a specified network. Use this command to also edit an existing deny rule.</td>
<td>page 11-72</td>
</tr>
<tr>
<td>permit</td>
<td>Creates a permit rule that allows packets from a specified source or sources. The source can be a single device or a range of devices within a specified network. Use this command to also edit an existing permit rule.</td>
<td>page 11-73</td>
</tr>
<tr>
<td>no</td>
<td>Removes a deny and/or a permit access rule from this IPv4 EX3500 extended ACL</td>
<td>page 11-74</td>
</tr>
</tbody>
</table>
11.6.1 deny

Creates a deny rule that rejects packets from a specified source or sources. The source can be a single device or a range of devices within a specified network. Use this command to also edit an existing deny rule.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

Syntax

deny [<SOURCE-NETWORK-IP/MASK>|any|host <SOURCE-HOST-IP>]
{ex3500-time-range <TIME-RANGE-NAME>}

Parameters
- deny [<SOURCE-NETWORK-IP/MASK>|any|host <SOURCE-HOST-IP>] {ex3500-time-range <TIME-RANGE-NAME>}

| deny [<SOURCE-NETWORK-IP/MASK>|any|host <SOURCE-HOST-IP>] | Creates a deny rule that rejects packets from a specified source or a network. Use one of the following options to specify the source: any, host, or network. |
| ex3500-time-range <TIME-RANGE-NAME> | Optional. Applies a periodic or absolute time range to this deny rule |
| <SOURCE-NETWORK-IP/MASK> | - Configures a network as the source. Provide the network's IPv4 address along with the mask. |
| any | - Specifies that the source can be any device |
| host <SOURCE-HOST-IP> | - Configures a single device as the source. Provide the host device's IPv4 address. |
| ex3500-time-range <TIME-RANGE-NAME> | - Specify the time range name (should be existing and configured). The ACL is triggered during the time period configured in the specified EX3500 time range. For information on configuring EX3500 time-range, see ex3500. |

Examples

nx9500-6C8809(config-ip-ex3500-std-acl-test)#deny 192.168.14.0/24

nx9500-6C8809(config-ip-ex3500-std-acl-test)#show context ip ex3500-std-access-list test
deny 192.168.13.0/24

Related Commands

no | Removes a specified deny access rule from this IPv4 EX3500 standard ACL
11.6.2 permit

> ex3500-std-access-list

Creates a permit rule that allows packets from a specified source or sources. The source can be a single device or a range of devices within a specified network. Use this command to also edit an existing permit rule.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

Syntax

```
permit [<SOURCE-NETWORK-IP/MASK>|any|host <SOURCE-HOST-IP>]
{ex3500-time-range <TIME-RANGE-NAME>}
```

Parameters

- `permit [<SOURCE-NETWORK-IP/MASK>|any|host <SOURCE-HOST-IP>] {ex3500-time-range <TIME-RANGE-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`permit [&lt;SOURCE-NETWORK-IP/MASK&gt;</td>
<td>any</td>
</tr>
<tr>
<td><code>any</code></td>
<td>Specifies that the source can be any device</td>
</tr>
<tr>
<td><code>host &lt;SOURCE-HOST-IP&gt;</code></td>
<td>Configures a single device as the source. Provide the host device's IPv4 address.</td>
</tr>
<tr>
<td><code>&lt;SOURCE-NETWORK-IP/MASK&gt;</code></td>
<td>Configures a network as the source. Provide the network's IPv4 address along with the mask.</td>
</tr>
<tr>
<td><code>ex3500-time-range &lt;TIME-RANGE-NAME&gt;</code></td>
<td>Optional. Applies a periodic or absolute time range to this deny rule</td>
</tr>
<tr>
<td><code>&lt;TIME-RANGE-NAME&gt;</code></td>
<td>Specify the time range name (should be existing and configured). The ACL is triggered during the time period configured in the specified EX3500 time range. For information on configuring EX3500 time-range, see ex3500.</td>
</tr>
</tbody>
</table>

Examples

```
nx9500-6C8809(config-ip-ex3500-std-acl-test)#permit host 192.168.13.13 ex3500-time-range EX3500_TimeRange_01

nx9500-6C8809(config-ip-ex3500-std-acl-test)#show context ip ex3500-std-access-list test
deny 192.168.13.13/24
permit host 192.168.13.13 ex3500-time-range EX3500_TimeRange_01
```

Related Commands

```
no
```

Removes a specified permit access rule from this IPv4 EX3500 standard ACL
11.6.3 no

`ex3500-std-access-list`

Removes a deny or permit access rule from this IPv4 EX3500 standard ACL

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [deny|permit] [<SOURCE-IP/MASK>|any|host <IP>] {ex3500-time-range <TIME-RANGE-NAME>}
```

**Parameters**

- `no <PARAMETERS>`

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes a deny or permit access rule based on the parameters passed</th>
</tr>
</thead>
</table>

**Examples**

The following example shows the IPv4 EX3500 standard ACL ‘test’ settings before the ‘no’ commands are executed:

```
nx9500-6C8809(config-ip-ex3500-std-acl-test)#show context
ip ex3500-std-access-list test
  deny 192.168.14.0/24
  permit host 192.168.13.13 ex3500-time-range EX3500_TimeRange_01
nx9500-6C8809(config-ip-ex3500-std-acl-test)#
```

```
nx9500-6C8809(config-ip-ex3500-std-acl-test)#no deny 192.168.14.0/24
```

The following example shows the IPv4 EX3500 standard ACL ‘test’ settings after the ‘no’ commands are executed:

```
nx9500-6C8809(config-ip-ex3500-std-acl-test)#show context
ip ex3500-std-access-list test
  permit host 192.168.13.13 ex3500-time-range EX3500_TimeRange_01
nx9500-6C8809(config-ip-ex3500-std-acl-test)#
```
This chapter summarizes *Dynamic Host Control Protocols* (DHCP) server policy commands in the CLI command structure.

DHCP automatically assigns network IP addresses to requesting clients to enable them access to network resources. DHCP tracks IP address assignments, their lease times and their availability. Each subnet can be configured with its own address pool. Whenever a DHCP client requests an IP address, the DHCP server assigns an IP address from that subnet’s address pool. When the controller's (wireless controller, service platform, or access point) onboard DHCP server allocates an address to a DHCP client, the client is assigned a lease, which expires after a pre-determined interval. Before a lease expires, wireless clients (with assigned leases) are expected to renew them to continue using the addresses. Once the lease expires, the client is no longer permitted to use the leased IP address. The controller's DHCP server policy ensures all IP addresses are unique, and no IP address is assigned to a second client while the first client's assignment is valid (its lease has not expired). IP address management is conducted by a controller’s DHCP server and not by an administrator.

The controller’s internal DHCP server groups wireless clients based on defined user-class options. Clients with a defined set of user-class values are segregated by class. A DHCP server can associate multiple classes to each pool. Each class in a pool is assigned an exclusive range of IP addresses. DHCP clients are compared against classes. If the client matches one of the classes assigned to the pool, it receives an IP address from the range assigned to the class. If the client doesn't match any of the classes in the pool, it receives an IP address from a default pool range (if defined). Multiple IP addresses for a single VLAN allow the configuration of multiple IP addresses, each belonging to different subnets. Class configuration allows a DHCP client to obtain an address from the first pool to which the class is assigned.

Use the (config) instance to configure DHCP/DHCPv6 server policy parameters. To navigate to the config DHCP server policy instance, use the following commands:

```plaintext
<rfs7000-37FABE>(config)#dhcp-server-policy <POLICY-NAME>
<rfs7000-37FABE>(config-dhcp-server-policy-test)#
```

DHCP policy Mode commands:
- `bootp` BOOTP specific configuration
- `dhcp-class` Configure DHCP class (for address allocation using DHCP user-class options)
- `dhcp-pool` Configure DHCP server address pool
- `dhcp-server` Activating dhcp server based on criteria
- `no` Negate a command or set its defaults
- `option` Define DHCP server option
- `ping` Specify ping parameters used by DHCP Server
- `clrscr` Clears the display screen
commit       Commit all changes made in this session
do           Run commands from Exec mode
end          End current mode and change to EXEC mode
exit         End current mode and down to previous mode
help         Description of the interactive help system
revert       Revert changes
service      Service Commands
show         Show running system information
write        Write running configuration to memory or terminal

rfs7000-37FABE(config-dhcp-policy-test)#

To navigate to the config DHCPv6 server policy instance, use the following commands:
<DEVICE>(config)#dhcpv6-server-policy <POLICY-NAME>

rfs7000-37FABE(config)#dhcpv6-server-policy test
rfs7000-37FABE(config-dhcpv6-server-policy-test)#

rfs7000-37FABE(config-dhcpv6-server-policy-test)#?
DHCPv6 server policy Mode commands:

dhcpv6-pool Configure DHCPv6 server address pool
no            Negate a command or set its defaults
option       Define DHCPv6 server option
restrict-vendor-options Restrict vendor specific options to be sent in server reply
server-preference Server preference value sent in the reply, by the server to client
clrscr       Clears the display screen
commit       Commit all changes made in this session
do           Run commands from Exec mode
end          End current mode and change to EXEC mode
exit         End current mode and down to previous mode
help         Description of the interactive help system
revert       Revert changes
service      Service Commands
show         Show running system information
write        Write running configuration to memory or terminal

rfs7000-37FABE(config-dhcpv6-server-policy-test)#

This chapter is organized as follows:

- dhcp-server-policy
- dhcpv6-server-policy

NOTE: The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
## 12.1 dhcp-server-policy

The following table summarizes DHCP server policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>bootp</td>
<td>Configures a BOOTP specific configuration</td>
<td>page 12-4</td>
</tr>
<tr>
<td>dhcp-class</td>
<td>Configures a DHCP server class</td>
<td>page 12-5</td>
</tr>
<tr>
<td>dhcp-pool</td>
<td>Configures a DHCP server address pool</td>
<td>page 12-11</td>
</tr>
<tr>
<td>dhcp-server</td>
<td>Configures the activation-criteria that triggers dynamic activation of DHCP service running on a redundancy device</td>
<td>page 12-54</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 12-56</td>
</tr>
<tr>
<td>option</td>
<td>Defines the DHCP option used in DHCP pools</td>
<td>page 12-57</td>
</tr>
<tr>
<td>ping</td>
<td>Specifies ping parameters used by a DHCP server</td>
<td>page 12-58</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrsc, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
### 12.1.1 bootp

- **dhcp-server-policy**

Configures a BOOTP specific configuration

*Bootstrap Protocol* (BOOTP) requests are used by UNIX diskless workstations to obtain the location of their boot image and IP address within the managed network. A BOOTP configuration server provides this information and also assigns an IP address from a configured pool of IP addresses. By default, all BOOTP requests are forwarded to the BOOTP configuration server by the controller. When enabled, this feature allows controllers, using this DHCP server policy, to ignore BOOTP requests.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
bootp ignore
```

**Parameters**

- `bootp ignore`

<table>
<thead>
<tr>
<th>bootp ignore</th>
<th>Enables controllers to ignore BOOTP requests</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config-dhcp-policy-test)#bootp ignore
rfs7000-37FABE(config-dhcp-policy-test)#show context
dhcp-server-policy test
  bootp ignore
rfs7000-37FABE(config-dhcp-policy-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>no</th>
<th>Disables the ignore BOOTP requests option</th>
</tr>
</thead>
</table>
12.1.2 dhcp-class

A controller, service platform, or access point’s local DHCP server assigns IP addresses to requesting DHCP clients based on user class option names. The DHCP server can assign IP addresses from as many IP address ranges as defined by an administrator. The DHCP user class associates a particular range of IP addresses to a device in such a way that all devices of that type are assigned IP addresses from the defined range.

A DHCP user class applies different DHCP settings to a set of wireless clients. Wireless clients using the same DHCP settings are grouped under one DHCP class. Grouping users into classes facilitates the provision of differentiated service.

The following table summarizes DHCP class configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcp-class</td>
<td>Creates a DHCP class and enters its configuration mode</td>
<td>page 12-6</td>
</tr>
<tr>
<td>dhcp-class-mode</td>
<td>Invokes DHCP class configuration commands</td>
<td>page 12-7</td>
</tr>
</tbody>
</table>

Table 12.2 DHCP-Class Config Commands
**12.1.2.1 dhcp-class**

`dhcp-class` creates a DHCP server class and enters its configuration mode. Use this command to configure user class option values. Once defined, the controller’s internal DHCP server uses the configured values to group wireless clients into DHCP classes. Therefore, each user class consists of wireless clients sharing the same set of user class values.

You can also use this command to modify an existing DHCP user class settings.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
dhcp-class <DHCP-CLASS-NAME>
```

**Parameters**

- `dhcp-class <DHCP-CLASS-NAME>`

**Examples**

```
rfs7000-37FABE(config-dhcp-policy-test)#dhcp-class dhcpclass1
```

```
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#?
DHCP class Mode commands:
multiple-user-class Enable multiple user class option
no Negate a command or set its defaults
option Configure DHCP Server options
clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal
```

```
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#
```

**Related Commands**

- `no` removes a configured DHCP user class policy.
**12.1.2.2 dhcp-class-mode commands**

- **dhcp-class**

Use DHCP class mode commands to configure the parameters of the DHCP user class. The following table summarizes DHCP user class configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>multiple-user-class</code></td>
<td>Enables multiple user class option for this DHCP user class policy</td>
<td>page 12-8</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negates a command or sets its default</td>
<td>page 12-9</td>
</tr>
<tr>
<td><code>option</code></td>
<td>Configures DHCP user class options for this DHCP user class policy</td>
<td>page 12-10</td>
</tr>
</tbody>
</table>
12.1.2.2.1 multiple-user-class

* dhcp-class-mode commands

Enables multiple user class option for this DHCP user class policy. Enabling this option allows this user class to transmit multiple option values to other DHCP servers also supporting multiple user class options.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
multiple-user-class
```

Parameters

None

Examples

```
rfs7000-37FABE(config-dhcp-policy-test-class-class1)#multiple-user-class
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#show context
dhcp-class dhcpclass1
    multiple-user-class
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#
```

Related Commands

```
no
```
Disables the multiple user class option for the selected DHCP user class policy
12.1.2.2.2 no

- **dhcp-class-mode commands**

Removes this DHCP user class policy's settings

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

no [multiple-user-class|option]
no option user-class <VALUE>

**Parameters**

- no <PARAMETERS>

  no <PARAMETERS> Disables multiple user class options on this DHCP user class policy

**Examples**

The following example shows the DHCP class settings before the 'no' commands are executed:

```
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#show context
dhcp-class dhcpclass1
  option user-class hex
  multiple-user-class
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#
```

```
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#no multiple-user-class
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#no option user-class hex
```

The following example shows the DHCP class settings after the 'no' commands are executed:

```
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#show context
dhcp-class dhcpclass1
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#
```
12.1.2.2.3 option

* dhcp-class-mode commands

Configures DHCP user class options for this DHCP user class policy

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
option user-class <VALUE>
```

**Parameters**

- `option user-class <VALUE>`

**Examples**

```
rfs7000-37FABE(config-dhcp-policy-test-class-class1)#option user-class hex
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#show context
dhcp-class dhcpclass1
  option user-class hex
  multiple-user-class
rfs7000-37FABE(config-dhcp-policy-test-class-dhcpclass1)#
```

**Related Commands**

- `no` Removes the configured DHCP user class option
12.1.3 dhcp-pool

The DHCP pool command creates and manages a pool of IP addresses. These IP addresses are assigned to devices using the DHCP protocol. IP addresses have to be unique for each device in the network. Since IP addresses are finite, DHCP ensures that every device, in the network, is issued a unique IP address by tracking the issue, release, and reissue of IP addresses.

The DHCP pool command configures a finite set of IP addresses that can be assigned whenever a device joins a network.

The following table summarizes DHCP pool configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcp-pool</td>
<td>Creates a DHCP pool and enters its configuration mode</td>
<td>page 12-12</td>
</tr>
<tr>
<td>dhcp-pool-mode commands</td>
<td>Summarizes DHCP pool configuration mode commands</td>
<td>page 12-14</td>
</tr>
</tbody>
</table>
12.1.3.1 dhcp-pool

```
- dhcp-pool
```

Configures a DHCP server address pool

DHCP services are available for specific IP interfaces. A pool (or range) of IP network addresses and DHCP options can be created for each IP interface defined. This range of addresses is available to DHCP enabled wireless devices on either a permanent or leased basis. This enables the reuse of limited IP address resources for deployment in any network. DHCP options are provided to each DHCP client with a DHCP response and provides DHCP clients information required to access network resources (default gateway, domain name, DNS server and WINS server configuration). An option exists to identify the vendor and functionality of a DHCP client. The information is a variable-length string of characters (or octets) with a meaning specified by the vendor of the DHCP client.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
```
dhcp-pool <POOL-NAME>
```

Parameters
- dhcp-pool <POOL-NAME>

<table>
<thead>
<tr>
<th>&lt;POOL-NAME&gt;</th>
<th>Creates a DHCP server address pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;POOL-NAME&gt;</td>
<td>- Specify a name that appropriately identifies this DHCP address pool. If the pool does not exist, it is created. The pool name cannot be modified as part of the edit process. However, an obsolete address pool can be deleted.</td>
</tr>
</tbody>
</table>

Examples
```
rfs7000-37FABE(config-dhcp-policy-test)#dhcp-pool pool1
```
```
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1)#?
```

DHCP pool Mode commands:
- address
- bootfile
- ddns
- default-router
- dns-server
- domain-name
- excluded-address
- lease
- netbios-name-server
- netbios-node-type
- network
- next-server
- no
- option
- respond-via-unicast
- static-binding
- static-route
- update
- clrscr
- commit
- do
- end
- exit

clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
der End current mode and change to EXEC mode
exit End current mode and down to previous mode
help                     Description of the interactive help system
revert                  Revert changes
service                 Service Commands
show                    Show running system information
write                   Write running configuration to memory or terminal

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1)#

Related Commands

| no           | Removes a specified DHCP address pool |
12.1.3.2 dhcp-pool-mode commands

dhcp-pool

Configures the DHCP pool parameters

The following table summarizes DHCP pool configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>address</td>
<td>Specifies a range of addresses for a DHCP address pool</td>
<td>page 12-15</td>
</tr>
<tr>
<td>bootfile</td>
<td>Assigns a bootfile name. The bootfile name can contain letters, numbers, dots and hyphens. Consecutive dots and hyphens are not permitted.</td>
<td>page 12-17</td>
</tr>
<tr>
<td>ddns</td>
<td>Configures dynamic DNS parameters</td>
<td>page 12-18</td>
</tr>
<tr>
<td>default-router</td>
<td>Configures a default router or gateway IP address for the network pool</td>
<td>page 12-20</td>
</tr>
<tr>
<td>dns-server</td>
<td>Sets a DNS server’s IP address available to all DHCP clients connected to the DHCP pool</td>
<td>page 12-21</td>
</tr>
<tr>
<td>domain-name</td>
<td>Sets the domain name for the network pool</td>
<td>page 12-23</td>
</tr>
<tr>
<td>excluded-address</td>
<td>Prevents a DHCP server from assigning certain addresses to the DHCP pool</td>
<td>page 12-24</td>
</tr>
<tr>
<td>lease</td>
<td>Sets a valid lease for the IP address used by DHCP clients in the DHCP pool</td>
<td>page 12-26</td>
</tr>
<tr>
<td>netbios-name-server</td>
<td>Configures a NetBIOS (WINS) name server’s IP address</td>
<td>page 12-27</td>
</tr>
<tr>
<td>netbios-node-type</td>
<td>Defines the NetBIOS node type</td>
<td>page 12-28</td>
</tr>
<tr>
<td>network</td>
<td>Configures the network on which the DHCP server is deployed</td>
<td>page 12-29</td>
</tr>
<tr>
<td>next-server</td>
<td>Configures the next server in the boot process</td>
<td>page 12-30</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 12-9</td>
</tr>
<tr>
<td>option</td>
<td>Configures RAW DHCP options</td>
<td>page 12-10</td>
</tr>
<tr>
<td>respond-via-unicast</td>
<td>Sends a DHCP offer and DHCP Ack as unicast messages</td>
<td>page 12-35</td>
</tr>
<tr>
<td>static-route</td>
<td>Configures a static route for a DHCP pool</td>
<td>page 12-34</td>
</tr>
<tr>
<td>update</td>
<td>Controls the usage of the DDNS service</td>
<td>page 12-36</td>
</tr>
<tr>
<td>static-binding</td>
<td>Configures static address bindings</td>
<td>page 12-37</td>
</tr>
</tbody>
</table>
12.1.3.2.4 address

**dhcp-pool-mode commands**

Adds IP addresses to the DHCP address pool. These IP addresses are assigned to each device joining the network.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
address [<IP>|<HOST-ALIAS-NAME>|range]
```

```
address [<IP>|<HOST-ALIAS-NAME>|range [<START-IP>|<START-HOST-ALIAS-NAME>] [<END-IP>|<END-HOST-ALIAS-NAME>]] {class <DHCP-CLASS-NAME>}
```

**Parameters**

- **address [<IP>|<HOST-ALIAS-NAME>|range]**
  
  Adds a single IP address to the DHCP address pool

- **<HOST-ALIAS-NAME>**
  
  Adds a single host mapped to the specified host alias. The host alias should be existing and configured.

  **Note:** A network host alias maps a name to a single network host. For example, ‘alias host $HOST 1.1.1.100’. In this example the host alias is `$HOST` and it maps to a single host ‘1.1.1.100’. For more information, see alias.

- **range [<START-IP>|<START-HOST-ALIAS-NAME>] [<END-IP>|<END-HOST-ALIAS-NAME>]**
  
  Adds a range of IP addresses to the DHCP address pool. Use one of the following options to provide the first IP address in the range:
  
  - `<START-IP>` – Specifies the first IP address in the range
  - `<START-HOST-ALIAS-NAME>` – Specifies a host alias, mapped to the first IP address in the range

  Use one of the following options to provide the last IP address in the range:
  
  - `<END-IP>` – Specifies the last IP address in the range
  - `<END-HOST-ALIAS-NAME>` – Specifies a host alias, mapped to the last IP address in the range

  **Note:** The host aliases should be existing and configured.

- **class <DHCP-CLASS-NAME>**
  
  Optional. Applies additional DHCP options, or a modified set of options to those available to wireless clients. For more information, see dhcp-class.

  - `<DHCP-CLASS-NAME>` – Sets the DHCP class.

**Examples**

```
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#address 192.168.13.4 class dhcppclass1

rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  address 192.168.13.4 class dhcppclass1
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the DHCP pool's configured IP addresses</td>
</tr>
<tr>
<td><code>dhcp-class</code></td>
<td>Creates and configures the DHCP class parameters</td>
</tr>
<tr>
<td><code>alias</code></td>
<td>Creates and configures a network, VLAN, host, string, and network-service aliases</td>
</tr>
</tbody>
</table>
12.1.3.2.5 bootfile

*dhcp-pool-mode commands*

The Bootfile command provides a diskless node path to the image file while booting up. Only one file can be configured for each DHCP pool.

For more information on the BOOTP protocol with reference to the DHCP policy, see *bootp*.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
bootfile <IMAGE-FILE-PATH>
```

**Parameters**

- `bootfile <IMAGE-FILE-PATH>`

**Examples**

```
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#bootfile test.txt
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
  dhcp-pool testPool
    address 192.168.13.4 class dhcpclass1
    bootfile test.txt
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets the boot image path for BOOTP clients</td>
</tr>
<tr>
<td><code>bootp</code></td>
<td>Configures BOOTP protocol parameters</td>
</tr>
</tbody>
</table>
12.1.3.2.6 ddns

Configures Dynamic Domain Name Service (DDNS) parameters. Dynamic DNS provides a way to access an individual device in a DHCP serviced network using a static device name. Depending on the DHCP server’s configuration, the IP address of a device changes periodically. To ensure continuous accessibility to a device (having a dynamic IP address), the device’s current IP address is published to a DDNS server that resolves the static device name (used to access the device) with a changing IP address. The DDNS server must be accessible from outside the network and must be configured as an address resolver.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ddns [domainname|multiple-user-class|server|ttl]
ddns domainname <DDNS-DOMAIN-NAME>
ddns multiple-user-class
ddns server [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}
ddns ttl <1-864000>

Parameters
- **ddns domainname <DDNS-DOMAIN-NAME>**
  Sets the domain name used for DNS updates
  The controller uses DNS to convert human readable host names into IP addresses. Host names are not case sensitive and can contain alphabetic or numeric letters or a hyphen. A *Fully Qualified Domain Name (FQDN)* consists of a host name plus a domain name. For example, computername.domain.com.

- **ddns multiple-user-class**
  Enables the multiple user class options with this DDNS domain

- **ddns server [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}**
  Configures the primary DDNS server. This is the default server.

- **ddns ttl <1-864000>**
  Configures the primary DDNS server’s IP address. The host alias should be existing and configured.

**Note:** A network host alias maps a name to a single network host. For example, ‘alias host $HOST 1.1.1.100’. In this example the host alias is ‘$HOST’ and it maps to a single host ‘1.1.1.100’. For more information, see alias.
In the lower part of the page, the document continues with a table and textual explanations:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`{&lt;IP1&gt;</td>
<td>&lt;HOST-ALIAS-NAME1&gt;}`</td>
</tr>
<tr>
<td><code>ttl &lt;1-864000&gt;</code></td>
<td>Configures the Time To Live (TTL) value for DDNS updates • <code>&lt;1-86400&gt;</code> – Specify a value from 1- 864000 seconds.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#ddns domainname WID
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#ddns multiple-user-class
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#ddns server 192.168.13.9
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  address 192.168.13.4 class dhcpclass1
ddns server 192.168.13.9
ddns domainname WID
ddns multiple-user-class
bootfile test.txt
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets or disables a DHCP pool’s DDNS settings</td>
</tr>
</tbody>
</table>
### 12.1.3.2.7 default-router

**dhcp-pool-mode commands**

Configures a default router or gateway IP address for a network pool.

After a DHCP client has booted, the client begins sending packets to its default router. Set the IP address of one or a group of routers the controller uses to map host names into IP addresses available to DHCP supported clients. Up to 8 default router IP addresses are supported.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9600

**Syntax**

default-router [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}

**Parameters**
- default-router [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}

| [<IP>|<HOST-ALIAS-NAME>] | Configures the primary default router, using one of the following options:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;IP&gt; – Specifies the primary default router’s IP address</td>
</tr>
<tr>
<td></td>
<td>• &lt;HOST-ALIAS-NAME&gt; – Specifies a host alias, mapped to the primary default router’s IP address</td>
</tr>
</tbody>
</table>

| {<IP1>|<HOST-ALIAS-NAME1>} | Optional. Configures the secondary default router, using one of the following options:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;IP1&gt; – Specifies the secondary default router’s IP address</td>
</tr>
<tr>
<td></td>
<td>• &lt;HOST-ALIAS-NAME1&gt; – Specifies a host alias, mapped to the secondary default router’s IP address. If the primary default router is unavailable, the secondary router is used.</td>
</tr>
</tbody>
</table>

**Note:** A network host alias maps a name to a single network host. For example, ‘alias host $HOST 1.1.1.100’. In this example the host alias is '$HOST' and it maps to a single host '1.1.1.100'. For more information, see alias.

**Note:** A maximum of 8 default routers can be configured.

**Usage Guidelines**
The IP address of the router should be on the same subnet as the client subnet.

**Examples**
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#default-router 192.168.13.8 192.168.13.9

rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  address 192.168.13.4 class dhcpclass1
ddns server 192.168.13.9
ddns domainname WID
ddns multiple-user-class
bootfile test.txt
default-router 192.168.13.8 192.168.13.9
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#

**Related Commands**

| no | Removes the default router settings |
12.1.3.2.8 dns-server

- **dhcp-pool-mode commands**

  Configures a network’s DNS server. The DNS server supports all clients connected to networks supported by the DHCP server.

  For DHCP clients, the DNS server’s IP address maps the hostname to an IP address. DHCP clients use the DNS server’s IP address based on the order (sequence) configured.

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

dns-server [IP|HOST-ALIAS-NAME] {IP1|HOST-ALIAS-NAME1}

**Parameters**

- dns-server [IP|HOST-ALIAS-NAME] {IP1|HOST-ALIAS-NAME1}

<table>
<thead>
<tr>
<th>[IP] &lt;HOST-ALIAS-NAME&gt;</th>
<th>Configures the primary DNS server, using one of the following options:</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP&gt;</td>
<td>Specifies the primary DNS server’s IP address</td>
</tr>
<tr>
<td>&lt;HOST-ALIAS-NAME&gt;</td>
<td>Specifies a host alias, mapped to the primary DNS server’s IP address</td>
</tr>
</tbody>
</table>

**Note:** A maximum of 8 DNS servers can be configured.

**Note:** To enable redirection of DSN queries to OpenDNS it is necessary that the DNS server IP address provided here should point to the OpenDNS IP address. OpenDNS is a proxy DNS server that provides additional functionality, such as Web filtering, reporting, and performance enhancements. When configured on a WLAN, DNS queries from wireless clients are redirected to OpenDNS. For more information on configuring OpenDNS on a WLAN, see [opendns](#).

| {IP1|HOST-ALIAS-NAME1} | Optional. Configures the secondary DNS server, using one of the following options: |
|-----------------------|----------------------------------------------------------------------------------|
| <IP1>                 | Specifies the secondary DNS server’s IP address                                 |
| <HOST-ALIAS-NAME1>   | Specifies a host alias, mapped to the secondary DNS server’s IP address. If the primary DNS server is unavailable, the secondary server is used. |

**Note:** A network host alias maps a name to a single network host. For example, ‘alias host $HOST 1.1.1.100’. In this example the host alias is ‘$HOST’ and it maps to a single host ‘1.1.1.100’. For more information, see [alias](#).

**Note:** A maximum of 8 DNS servers can be configured.

**Examples**

rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#dns-server 192.168.13.19

rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  address 192.168.13.4 class dhcpclass1
ddns server 192.168.13.9
ddns domainname WID
ddns multiple-user-class
bootfile test.txt
default-router 192.168.13.8 192.168.13.9
dns-server 192.168.13.19
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
## Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes DNS server settings</td>
</tr>
</tbody>
</table>
12.1.3.2.9 domain-name

Sets the domain name for the DHCP pool. This is the domain name used by the controller with this pool.

Domain names are not case sensitive and can contain alphabetic or numeric letters or a hyphen. The FQDN consists of the host name and the domain name. For example, computername.domain.com.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
domain-name <DOMAIN-NAME>
```

Parameters

- `<DOMAIN-NAME>`

Examples

```
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#domain-name documentation
```
```
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  address 192.168.13.4 class dhcpclass1
dns server 192.168.13.9
ddns domainname WID
ddns multiple-user-class
domain-name documentation
  bootfile test.txt
  default-router 192.168.13.8 192.168.13.9
dns-server 192.168.13.19
```
```
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```

Related Commands

```
no
```

Removes a DHCP pool's domain name
12.1.3.2.10 excluded-address

Identifies a single IP address or a range of IP addresses, included in the DHCP address pool, that cannot be assigned to clients by the DHCP server.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

excluded-address [<IP>|<HOST-ALIAS-NAME>|range]

excluded-address <IP>
excluded-address <HOST-ALIAS-NAME>
excluded-address range [<START-IP>|<START-HOST-ALIAS-NAME>] [<END-IP>|<END-HOST-ALIAS-NAME>]

Parameters

- excluded-address <IP>
  
  Adds a single IP address to the excluded address list.

- excluded-address <HOST-ALIAS-NAME>
  
  Adds a host alias. The host alias is mapped to a host's IP address. The host identified by the host alias is added to the excluded address list. The host alias should be existing and configured.

  Note: A network host alias maps a name to a single network host. For example, 'alias host $HOST 1.1.1.100'. In this example the host alias is '$HOST' and it maps to a single host '1.1.1.100'. For more information, see alias.

- excluded-address range [<START-IP>|<START-HOST-ALIAS-NAME>] [<END-IP>|<END-HOST-ALIAS-NAME>]
  
  Adds a range of IP addresses to the excluded address list. Use one of the following options to provide the first IP address in the range:
  
  - <START-IP> — Specifies the first IP address in the range
  - <START-HOST-ALIAS-NAME> — Specifies a host alias, mapped to the first IP address in the range
  
  Use one of the following options to provide the last IP address in the range:
  
  - <END-IP> — Specifies the last IP address in the range
  - <END-HOST-ALIAS-NAME> — Specifies a host alias, mapped to the last IP address in the range

  Note: The host aliases should be existing and configured.
Examples

rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#excluded-address range 192.168.13.25 192.168.13.28

rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context dhcp-pool testPool
  network 192.168.13.0/24
  address 192.168.13.4 class dhcpclass1
ddns server 192.168.13.9
ddns domainname WID
ddns multiple-user-class
  excluded-address range 192.168.13.25 192.168.13.28
  domain-name documentation
  bootfile test.txt
  default-router 192.168.13.8 192.168.13.9
dns-server 192.168.13.19
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the exclude IP addresses settings</td>
</tr>
</tbody>
</table>
12.1.3.2.11 lease

- **dhcp-pool-mode commands**

A lease is the duration a DHCP issued IP address is valid. Once a lease expires, and if the lease is not renewed, the IP address is revoked and is available for reuse. Generally, before an IP lease expires, the client tries to get the same IP address issued for the next lease period. This feature is enabled by default, with a lease period of 24 hours (1 day).

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
lease [0-365]|infinite]
lease infinite
lease <0-365> {0-23} {0-59} {0-59}
```

**Parameters**

- `infinite` - The lease never expires (equal to a static IP address assignment)
- `lease <0-365> {0-23} {0-59} {0-59}`

**Usage Guidelines**

If lease parameter is not configured on the DHCP pool, the default is used. The default is 24 hours.

**Examples**

```
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#lease 100 23 59 59
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  network 192.168.13.0/24
  address 192.168.13.4 class dhcpclass1
  lease 100 23 59 59
  ddns server 192.168.13.9
dns domainname WID
  excluded-address range 192.168.13.25 192.168.13.28
  domain-name documentation
  bootfile test.txt
  default-router 192.168.13.8 192.168.13.9
dns-server 192.168.13.19
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```

**Related Commands**

- `no` - Resets values or disables the DHCP pool lease settings
12.1.3.12 netbios-name-server

 dhcp-pool-mode commands

Configures the NetBIOS (WINS) name server's IP address. This server is used to resolve NetBIOS host names.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
netbios-name-server [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}

Parameters
- netbios-name-server [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}

Examples
rfs4000-229D58 (config-dhcp-policy-test-pool-testPool)#netbios-name-server 192.168.13.25
rfs4000-229D58 (config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  network 192.168.13.0/24
dns_server 192.168.13.9
dns_domainname WID
dns_multiple-user-class
excluded-address range 192.168.13.25 192.168.13.28
domain-name documentation
bootfile test.txt
default-router 192.168.13.8 192.168.13.9
dns-server 192.168.13.19
netbios-name-server 192.168.13.25
rfs4000-229D58 (config-dhcp-policy-test-pool-testPool)#

Related Commands

no | Removes the NetBIOS name server settings
12.1.3.2.13 netbios-node-type

**dhcp-pool-mode commands**

Defines the predefined NetBIOS node type. The NetBIOS node type resolves NetBIOS names to IP addresses.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
netbios-node-type [b-node|h-node|m-node|p-node]
```

**Parameters**

- `netbios-node-type [b-node|h-node|m-node|p-node]`

### Examples

```
rfs4000-229D58 (config-dhcp-policy-test-pool-testPool)#netbios-node-type b-node
```
```
rfs4000-229D58 (config-dhcp-policy-test-pool-testPool)#show context dhcp-pool testPool  
  network 192.168.13.0/24  
  address 192.168.13.4 class dhcpclass1  
  lease 100 23 59 59  
  ddns server 192.168.13.9  
  ddns domainname WID  
  ddns multiple-user-class  
  excluded-address range 192.168.13.25 192.168.13.28  
  domain-name documentation netbios-node-type b-node  
  bootfile test.txt  
  default-router 192.168.13.8 192.168.13.9  
  dns-server 192.168.13.19  
  netbios-name-server 192.168.13.25  

rfs4000-229D58 (config-dhcp-policy-test-pool-testPool)#
```

**Related Commands**

```
no
```
Removes the NetBIOS node type settings
12.1.3.2.14 network

*dhcp-pool-mode commands*

Configures the DHCP server’s network settings

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
network [<IP/M]|<NETWORK-ALIAS-NAME>]
```

**Parameters**

- **network [<IP/M]|<NETWORK-ALIAS-NAME>]**

| **<IP/M>** | Configures the network number and mask (for example, 192.168.13.0/24) |
| **<NETWORK-ALIAS-NAME>** | Configures a network alias to identify the network number and mask |
| | • <NETWORK-ALIAS-NAME> – Specify the network alias name. It should be existing and configured. |
| | **Note:** A network alias defines a single network address. For example, ‘alias network $NET 1.1.1/24’. In this example, the network alias name is: $NET and the network it is mapped to is: 1.1.1/24. For more information, see alias. |

**Examples**

```plaintext
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#network 192.168.13.0/24
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  **network 192.168.13.0/24**
  address 192.168.13.4 class dhcpclass1
  lease 100 23 59 59
  ddns server 192.168.13.9
  ddns domainname WID
  ddns multiple-user-class
  excluded-address range 192.168.13.25 192.168.13.28
  domain-name documentation
  netbios-node-type b-node
  bootfile test.txt
  default-router 192.168.13.8 192.168.13.9
dns-server 192.168.13.19
  netbios-name-server 192.168.13.25
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```

**Related Commands**

| **no** | Removes the network number and mask configured for this DHCP pool |
12.1.3.2.15 next-server

- **dhcp-pool-mode commands**

  Configures the next server in the boot process

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`next-server [<IP>|<HOST-ALIAS-NAME>]`

**Parameters**

- `next-server [<IP>|<HOST-ALIAS-NAME>]`

<table>
<thead>
<tr>
<th><code>&lt;IP&gt;</code></th>
<th>Configures the next server’s (the first server in the boot process) IP address</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;HOST-ALIAS-NAME&gt;</code></td>
<td>Configures a host alias, mapped to the next server’s IP address</td>
</tr>
</tbody>
</table>

- `<HOST-ALIAS-NAME>` – Specify the host alias name. It should be existing and configured.

**Note:** A host alias maps a name to a single network host. For example, ‘alias host $HOST 1.1.1.100’. In this example the host alias is `$HOST` and it maps to a single host ‘1.1.1.100’. For more information, see alias.

**Examples**

```
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#next-server 192.168.13.26
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  network 192.168.13.0/24
  address 192.168.13.4 class dhcpclass1
  lease 100 23 59 59
ddns server 192.168.13.9
ddns domainname WID
ddns multiple-user-class
excluded-address range 192.168.13.25 192.168.13.28
domain-name documentation
netbios-node-type b-node
bootfile test.txt
default-router 192.168.13.8 192.168.13.9
dns-server 192.168.13.19
netbios-name-server 192.168.13.25
  next-server 192.168.13.26
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```

**Related Commands**

| `no` | Removes the next server configuration settings |
12.1.3.2.16 no

* dhcp-pool-mode commands

Removes or resets this DHCP user pool's settings

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [address|bootfile|ddns|default-router|dns-server|domain-name|excluded-address|lease|netbios-name-server|netbios-node-type|network|next-server|option|respond-via-unicast|static-binding|static-route|update]

no [bootfile|default-router|dns-server|domain-name|lease|netbios-name-server|netbios-node-type|next-server|network|respond-via-unicast]

no address [<IP>|<HOST-ALIAS-NAME>|all]
no address range [<START-IP>|<START-HOST-ALIAS-NAME>] [<END-IP>|<END-HOST-ALIAS-NAME>]

no ddns [domainname|multiple-user-class|server|ttl]

no excluded-address [<IP>|<HOST-ALIAS-NAME>]  
no excluded-address range [<START-IP>|<START-HOST-ALIAS-NAME>] [<END-IP>|<END-HOST-ALIAS-NAME>]

no option <OPTION-NAME>

no static-binding client-identifier <CLIENT-IDENTIFIER>
no static-binding hardware-address <MAC>

no static-route <IP/MASK> <GATEWAY-IP>

no update dns {override}

Parameters

- no <PARAMETERS>

Examples

The following example shows the DHCP pool settings before the 'no' commands are executed:

rfs4000-229D58 (config-dhcp-policy-test-pool-testPool)#show context

dhcp-pool testPool

 network 192.168.13.0/24
  address 192.168.13.4 class dhcpclass1
  lease 100 23 59 59
  ddns server 192.168.13.9
  ddns domainname WID
  ddns multiple-user-class
  excluded-address range 192.168.13.25 192.168.13.28
  domain-name documentation
  netbios-node-type b-node
  bootfile test.txt
  default-router 192.168.13.8 192.168.13.9
  dns-server 192.168.13.19
  netbios-name-server 192.168.13.25
  next-server 192.168.13.26
rfs4000-229D58 (config-dhcp-policy-test-pool-testPool)#

The following example shows the DHCP pool settings after the 'no' commands are executed:

```bash
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
   address 192.168.13.4 class dhcpclass1
ddns server 192.168.13.9
ddns multiple-user-class
   excluded-address range 192.168.13.25 192.168.13.28
netbios-node-type b-node
dns-server 192.168.13.19
netbios-name-server 192.168.13.25
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```
12.1.3.2.17 option

**dhcp-pool-mode commands**

Configures raw DHCP options. The DHCP option must be configured under the DHCP server policy. The options configured under the DHCP pool/DHCP server policy can also be used in static-bindings.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
option <OPTION-NAME> [ <DHCP-OPTION-IP> | <DHCP-OPTION-ASCII> ]
```

**Parameters**

- **option <OPTION-NAME> [ <DHCP-OPTION-IP> | <DHCP-OPTION-ASCII> ]**

<table>
<thead>
<tr>
<th><strong>&lt;OPTION-NAME&gt;</strong></th>
<th>Sets the name of the DHCP option</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&lt;DHCP-OPTION-IP&gt;</strong></td>
<td>Sets DHCP option as an IP address</td>
</tr>
<tr>
<td><strong>&lt;DHCP-OPTION-ASCII&gt;</strong></td>
<td>Sets DHCP option as an ASCII string</td>
</tr>
</tbody>
</table>

NOTE: An option name in ASCII format accepts backslash (\) as an input but is not displayed in the output (Use `show running config` to view the output). Use a double backslash to represent a single backslash.

**Examples**

```plaintext
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#option option1 157.235.208.80
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  address 192.168.13.4 class dhcpclass1
ddns server 192.168.13.9
ddns multiple-user-class
excluded-address range 192.168.13.25 192.168.13.28
netbios-node-type b-node
dns-server 192.168.13.19
netbios-name-server 192.168.13.25
  option option1 157.235.208.80
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```

**Related Commands**

- `no` Resets values or disables the DHCP pool option settings
12.1.3.2.18 static-route

dhcp-pool-mode commands

Configures a static route for a DHCP pool. Static routes define a gateway for traffic intended for other networks. This gateway is always used when an IP address does not match any route in the network.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```plaintext
static-route <IP/M> <IP>
```

Parameters

- `static-route <IP/M> <IP>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP/M&gt;</td>
<td>Specifies the IP destination prefix (for example, 10.0.0.0/8)</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>Specifies the gateway IP address</td>
</tr>
</tbody>
</table>

Examples

```plaintext
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#static-route 192.168.13.0/24 192.168.13.7
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
address 192.168.13.4 class dhcpclass1
ddns server 192.168.13.9
ddns multiple-user-class
excluded-address range 192.168.13.25 192.168.13.28
netbios-node-type b-node
dns-server 192.168.13.19
netbios-name-server 192.168.13.25
option option1 157.235.208.80
respond-via-unicast
static-route 192.168.13.0/24 192.168.13.7
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes static route settings</td>
</tr>
</tbody>
</table>
12.1.3.2.19 respond-via-unicast

▸ dhcp-pool-mode commands

Sends DHCP offer and acknowledgement as unicast messages

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
respond-via-unicast

Parameters
None

Examples
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#respond-via-unicast

rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  address 192.168.13.4 class dhcpclass1
ddns server 192.168.13.9
  ddns multiple-user-class
  excluded-address range 192.168.13.25 192.168.13.28
  netbios-node-type b-node
dns-server 192.168.13.25
  netbios-name-server 192.168.13.25
  option option1 157.235.208.80
  respond-via-unicast
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables sending of a DHCP offer and DHCP Ack as unicast messages. When disabled, sends offer and acknowledgement as broadcast messages.</td>
</tr>
</tbody>
</table>
12.1.3.2.20 update

dhcp-pool-mode commands

Controls the use of the DDNS service

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

update dns {override}

Parameters

- update dns {override}

<table>
<thead>
<tr>
<th>dns (override)</th>
<th>Configures Dynamic DNS parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>override</td>
<td>Optional. Enables Dynamic DNS updates on an onboard DHCP server</td>
</tr>
</tbody>
</table>

Usage Guidelines

A DHCP client cannot perform updates for RR’s A, TXT and PTR resource records. Use update (dns) (override) to enable the internal DHCP server to send DDNS updates for resource records. The DHCP server can override the client, even if the client is configured to perform the updates.

In the DHCP server’s DHCP pool, FQDN is configured as the DDNS domain name. This is used internally in DHCP packets between the DHCP server and the DNS server.

Examples

rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#update dns override

rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
    address 192.168.13.4 class dhcpclass1
    update dns override
ddns server 192.168.13.9
ddns multiple-user-class
    excluded-address range 192.168.13.25 192.168.13.28
    netbios-node-type b-node
dns-server 192.168.13.19
    netbios-name-server 192.168.13.25
    option option1 157.235.208.80
    respond-via-unicast
    static-route 192.168.13.0/24 192.168.13.7
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#

Related Commands

no | Removes dynamic DNS service control
12.1.3.3 static-binding

* dhcp-pool-mode commands

Configures static IP address information for a particular device. Static address binding is executed on the device’s hostname, client identifier, or MAC address. Static bindings allow the configuration of client parameters, such as DHCP server, DNS server, default routers, fixed IP address etc.

The following table summarizes static binding configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>static-binding</td>
<td>Creates a static binding policy and enters its configuration mode</td>
<td>page 12-38</td>
</tr>
<tr>
<td>static-binding-mode</td>
<td>Invokes static binding configuration commands</td>
<td>page 12-40</td>
</tr>
</tbody>
</table>
12.1.3.3.21 static-binding

`static-binding`

Configures static address bindings

A static address binding is a collection of configuration parameters, including an IP address, associated with, or bound to, a DHCP client. Bindings are managed by DHCP servers. DHCP bindings automatically map a device MAC address to an IP address using a pool of DHCP supplied addresses. Static bindings assign IP addresses without creating numerous host pools with manual bindings. Static host bindings use a text file the DHCP server reads. It eliminates the need for a lengthy configuration file and reduces the space required to maintain address pools.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

Syntax

```
static-binding [client-identifier <CLIENT>|hardware-address <MAC>]
```

Parameters

- `static-binding [client-identifier <CLIENT>|hardware-address <MAC>]`

```
<table>
<thead>
<tr>
<th>client-identifier &lt;CLIENT&gt;</th>
<th>Enables a static binding configuration for a client based on its client identifier (as provided by DHCP option 61 and its key value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;CLIENT&gt; – Specify the client identifier (DHCP option 61).</td>
<td></td>
</tr>
<tr>
<td>hardware-address &lt;MAC&gt;</td>
<td>Enables a static binding configuration for a client based on its MAC address</td>
</tr>
<tr>
<td>&lt;MAC&gt; – Specify the MAC address of the client.</td>
<td></td>
</tr>
</tbody>
</table>
```

Examples

```
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#static-binding client-identifier test
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  address 192.168.13.4 class dhcpclass1
  update dns override
  ddns server 192.168.13.9
  ddns multiple-user-class
  excluded-address range 192.168.13.25 192.168.13.28
  netbios-node-type b-node
  ddns-server 192.168.13.19
  netbios-name-server 192.168.13.25
  option option1 157.235.208.80
  respond-via-unicast
  static-route 192.168.13.0/24 192.168.13.7
  static-binding client-identifier test
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```
DHCP static binding Mode commands:

- `bootfile` Boot file name
- `client-name` Client name
- `default-router` Default routers
- `dns-server` DNS Servers
- `domain-name` Configure domain-name
- `ip-address` Fixed IP address for host
- `netbios-name-server` NetBIOS (WINS) name servers
- `netbios-node-type` NetBIOS node type
- `next-server` Next server in boot process
- `no` Negate a command or set its defaults
- `option` Raw DHCP options
- `respond-via-unicast` Send DHCP offer and DHCP Ack as unicast messages
- `static-route` Add static routes to be installed on dhcp clients

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets values or disables the DHCP policy static binding settings</td>
</tr>
<tr>
<td><code>static-binding-mode commands</code></td>
<td>Invokes static binding configuration commands</td>
</tr>
</tbody>
</table>
### 12.1.3.3.22 static-binding-mode commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>bootfile</td>
<td>Assigns a Bootfile name for the DHCP configuration on the network pool</td>
<td>page 12-41</td>
</tr>
<tr>
<td>client-name</td>
<td>Configures a client name</td>
<td>page 12-42</td>
</tr>
<tr>
<td>default-router</td>
<td>Configures default router or gateway IP address</td>
<td>page 12-43</td>
</tr>
<tr>
<td>dns-server</td>
<td>Sets the DNS server’s IP address available to all DHCP clients connected to the DHCP pool</td>
<td>page 12-44</td>
</tr>
<tr>
<td>domain-name</td>
<td>Sets the network pool's domain name</td>
<td>page 12-45</td>
</tr>
<tr>
<td>ip-address</td>
<td>Configures a host’s fixed IP address</td>
<td>page 12-46</td>
</tr>
<tr>
<td>netbios-name-server</td>
<td>Configures a NetBIOS (WINS) name server IP address</td>
<td>page 12-47</td>
</tr>
<tr>
<td>netbios-node-type</td>
<td>Defines the NetBIOS node type</td>
<td>page 12-48</td>
</tr>
<tr>
<td>next-server</td>
<td>Specifies the next server used in the boot process</td>
<td>page 12-49</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 12-50</td>
</tr>
<tr>
<td>option</td>
<td>Configures raw DHCP options</td>
<td>page 12-51</td>
</tr>
<tr>
<td>respond-via-unicast</td>
<td>Sends a DHCP offer and DHCP Ack as unicast messages</td>
<td>page 12-52</td>
</tr>
<tr>
<td>static-route</td>
<td>Adds static routes installed on DHCP clients</td>
<td>page 12-53</td>
</tr>
</tbody>
</table>
12.1.3.23 bootfile

static-binding-mode commands

The Bootfile command provides a diskless node the path to the image file used while booting up. Only one file can be configured for each static IP binding.

For more information on the BOOTP protocol with reference to static binding, see `bootp`.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`bootfile <IMAGE-FILE-PATH>`

Parameters

- `bootfile <IMAGE-FILE-PATH>`

Examples

```
$bootfile test.txt
$show context static-binding client-identifier test
$bootfile test.txt
```

Related Commands

- `no` Resets values or disables DHCP pool static binding settings
- `bootp` Configures BOOTP protocol parameters
12.1.3.3.24 client-name

static-binding-mode commands

Configures the client's name

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

client-name <NAME>

Parameters

- client-name <NAME>

<NAME> Specify the name of the client using this static IP address host pool. Do not include the domain name.

Examples

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#client-name RFID

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context static-binding client-identifier test
     client-name RFID
     bootfile test.txt
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#

Related Commands

no Resets values or disables DHCP pool static binding settings
### 12.1.3.25 default-router

*static-binding-mode commands*

Configures a default router or gateway IP address for the static binding configuration

**Supported in the following platforms:**
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**
```
default-router [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}
```

**Parameters**
- `default-router [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}`

| [<IP>|<HOST-ALIAS-NAME>] | Configures the primary default router, using one of the following options: |
|-------------------------|--------------------------------------------------------------------------|
|                         | • `<IP>` – Specifies the primary default router’s IP address           |
|                         | • `<HOST-ALIAS-NAME>` – Specifies a host alias, mapped to the primary default router’s IP address |

| {<IP>|<HOST-ALIAS-NAME1>} | Optional. Configures the secondary default router, using one of the following options: |
|--------------------------|-------------------------------------------------------------------------------------|
|                         | • `<IP1>` – Specifies the secondary default router’s IP address                     |
|                         | • `<HOST-ALIAS-NAME1>` – Specifies a host alias, mapped to the secondary default router’s IP address. If the primary default router is unavailable, the secondary router is used. |

**Note:** A network host alias maps a name to a single network host. For example, ‘alias host $HOST 1.1.1.100’. In this example the host alias is ‘$HOST’ and it maps to a single host ‘1.1.1.100’. For more information, see alias.

**Usage Guidelines**
The IP address of the router should be on the same subnet as the client subnet.

**Examples**
```
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#default-router 172.16.10.8 172.16.10.9
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context static-binding client-identifier test bootfile test.txt
default-router 172.16.10.8 172.16.10.9
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#
```

**Related Commands**
- `no` Resets values or disables DHCP pool static binding settings
12.1.3.3.26 dns-server

*static-binding-mode commands*

Configures the DNS server for this static binding configuration. This DNS server supports the client for which the static binding has been configured.

For this client, the DNS server’s IP address maps the host name to an IP address. DHCP clients use the DNS server’s IP address based on the order (sequence) configured.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

dns-server [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}

**Parameters**

- dns-server [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}

| [<IP>|<HOST-ALIAS-NAME>] | Configures the primary DNS server, using one of the following options: |
|--------------------------|---------------------------------------------------------------|
|                          | • <IP> – Specifies the primary DNS server’s IP address            |
|                          | • <HOST-ALIAS-NAME> – Specifies a host alias, mapped to the primary DNS server’s IP address |

| {<IP1>|<HOST-ALIAS-NAME1>} | Optional. Configures the secondary DNS server, using one of the following options: |
|---------------------------|-----------------------------------------------------------------------------------|
|                          | • <IP1> – Specifies the secondary DNS server’s IP address                           |
|                          | • <HOST-ALIAS-NAME1> – Specifies a host alias, mapped to the secondary DNS server’s IP address. If the primary DNS server is unavailable, the secondary DNS server is used. |

**Note:** A network host alias maps a name to a single network host. For example, ‘alias host $HOST 1.1.1.100’. In this example the host alias is ‘$HOST’ and it maps to a single host ‘1.1.1.100’. For more information, see alias.

**Examples**

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#dns-server 172.16.10.7

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context

static-binding client-identifier test
client-name RFID
bootfile test.txt
default-router 172.16.10.8 172.16.10.9
dns-server 172.16.10.7
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resets values or disables DHCP pool static binding settings</td>
</tr>
</tbody>
</table>
12.1.3.27 domain-name

- static-binding-mode commands

Sets the domain name for the static binding configuration

Domain names are not case sensitive and contain alphabetic or numeric letters (or a hyphen). A fully qualified domain name (FQDN) consists of a host name plus a domain name. For example, computername.domain.com

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
domain-name <DOMAIN-NAME>

Parameters
- domain-name <DOMAIN-NAME>

Examples
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#domain-name documentation
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context static-binding client-identifier test
client-name RFID
domain-name documentation
bootfile test.txt
default-router 172.16.10.8 172.16.10.9
dns-server 172.16.10.7
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#

Related Commands

no

Resets values or disables the DHCP pool static binding settings
12.1.3.3.28 ip-address

- **static-binding-mode commands**

Configures a fixed IP address for a host

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ip-address [<IP>|<HOST-ALIAS-NAME>]
```

**Parameters**

- `<IP>`: Configures a fixed IP address (in dotted decimal format) of the client using this host pool
- `<HOST-ALIAS-NAME>`: Configures a host alias identifying the fixed IP address of the client using this host pool

**Note:** A network host alias maps a name to a single network host. For example, 'alias host $HOST 1.1.1.100'. In this example the host alias is `$HOST` and it maps to a single host '1.1.1.100'. For more information, see `alias`.

**Examples**

```
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#ip-address 172.16.10.9
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context static-binding client-identifier test
  ip-address 172.16.10.9
  client-name RFID
  domain-name documentation
  bootfile test.txt
  default-router 172.16.10.8 172.16.10.9
dns-server 172.16.10.7
```

**Related Commands**

- `no` Resets values or disables DHCP pool static binding settings
12.1.3.29 netbios-name-server

*static-binding-mode commands*

Configures the NetBIOS (WINS) name server’s IP address. This server is used to resolve NetBIOS host names.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
netbios-name-server [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}
```

**Parameters**
- `netbios-name-server [<IP>|<HOST-ALIAS-NAME>] {<IP1>|<HOST-ALIAS-NAME1>}`

| [<IP>|<HOST-ALIAS-NAME>] | Configures the primary NetBIOS server, using one of the following options:
|--------------------------|---------------------------------------------------
| • <IP> – Specifies the primary NetBIOS name server’s IP address
| • <HOST-ALIAS-NAME> – Specifies a host alias, mapped to the primary NetBIOS name server’s IP address
| {<IP1>|<HOST-ALIAS-NAME1>} | Optional. Configures the secondary NetBIOS name server, using one of the following options:
|--------------------------|---------------------------------------------------
| • <IP1> – Specifies the secondary NetBIOS name server’s IP address
| • <HOST-ALIAS-NAME1> – Specifies a host alias, mapped to the secondary NetBIOS name server’s IP address. If the primary NetBIOS name server is unavailable, the secondary server is used.

**Note:** A network host alias maps a name to a single network host. For example, ‘alias host $HOST 1.1.1.100’. In this example the host alias is ‘$HOST’ and it maps to a single host ‘1.1.1.100’. For more information, see `alias`.

**Examples**

```bash
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#netbios-name-server 172.16.10.23
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context
  static-binding client-identifier test
  client-name RFID
domain-name documentation
  bootfile test.txt
default-router 172.16.10.8 172.16.10.9
dns-server 172.16.10.7
  netbios-name-server 172.16.10.23
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#
```

**Related Commands**

| no | Resets values or disables DHCP pool static binding settings |
### 12.1.3.3.30 netbios-node-type

**static-binding-mode commands**

Configures different predefined NetBIOS node types. The NetBIOS node defines the way a device resolves NetBIOS names to IP addresses.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
netbios-node-type [b-node|h-mode|m-node|p-node]
```

**Parameters**

- `netbios-node-type [b-node|h-mode|m-node|p-node]`

| [b-node|h-mode|m-node|p-node] | Defines the netbios node type |
|--------------------------------|------------------------------|
| b-node                        | • b-node – Sets the node type as broadcast. Uses broadcasts to query nodes on the network for the owner of a NetBIOS name. | |
| h-node                        | • h-node – Sets the node type as hybrid. Uses a combination of two or more nodes. | |
| m-node                        | • m-node – Sets the node type as mixed. A mixed node uses broadcast queries to find a node, and failing that, queries a known p-node name server for the address. | |
| p-node                        | • p-node – Sets the node type as peer-to-peer. Uses directed calls to communicate with a known NetBIOS name server (such as a WINS server), for the IP address of a NetBIOS machine. | |

**Examples**

```
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#netbios-node-type b-node
```

```
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context
  static-binding client-identifier test
  client-name RFID
  domain-name documentation
  netbios-node-type b-node
  bootfile test.txt
  default-router 172.16.10.9
  path-server 172.16.10.7
  netbios-name-server 172.16.10.23
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#
```

**Related Commands**

| no | Resets values or disables DHCP pool static binding settings |
12.1.3.31 next-server

static-binding-mode commands

Configures the next server utilized in the boot process

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

next-server [<IP>|<HOST-ALIAS-NAME>]

Parameters

- next-server [<IP>|<HOST-ALIAS-NAME>]

<table>
<thead>
<tr>
<th>&lt;IP&gt;</th>
<th>Configures the next server's (the first server in the boot process) IP address</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;HOST-ALIAS-NAME&gt;</td>
<td>Configures a host alias, mapped to the next server’s IP address</td>
</tr>
<tr>
<td>• &lt;HOST-ALIAS-NAME&gt; – Specify the host alias name. It should be existing and configured.</td>
<td></td>
</tr>
<tr>
<td>Note: A network host alias maps a name to a single network host. For example, ‘alias host $HOST 1.1.1.100’. In this example the host alias is ‘$HOST’ and it maps to a single host ‘1.1.1.100’. For more information, see alias.</td>
<td></td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#next-server 172.16.10.24

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context static-binding client-identifier test
ip-address 172.16.10.9
client-name RFID
domain-name documentation
netbios-node-type b-node
bootfile test.txt
default-router 172.16.10.8 172.16.10.9
dns-server 172.16.10.7
netbios-name-server 172.16.10.23
next-server 172.16.10.24
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#

Related Commands

no Resets values or disables DHCP pool static binding settings
12.1.3.3.32 no

static-binding-mode commands

Negates or reverts static binding settings for the selected DHCP server policy

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [bootfile|client-name|default-router|dns-server|domain-name|ip-address|
    netbios-name-server|netbios-node-type|next-server|option|respond-via-unicast|
    static-route]

no option <OPTION-NAME>

no static-route <IP/MASK> <GATEWAY-IP>

Parameters

- no <PARAMETERS>

Examples

The following example shows the DHCP pool static binding settings before the ‘no’ commands are executed:

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context
static-binding client-identifier test
ip-address 172.16.10.9
client-name RFID
domain-name documentation
netbios-node-type b-node
bootfile test.txt
default-router 172.16.10.8 172.16.10.9
dns-server 172.16.10.7
next-server 172.16.10.24
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#no bootfile
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#no ip-address
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#no default-router
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#no dns-server

The following example shows the DHCP pool static binding settings after the ‘no’ commands are executed:

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context
static-binding client-identifier test
client-name RFID
domain-name documentation
netbios-node-type b-node
netbios-name-server 172.16.10.23
next-server 172.16.10.24
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#
12.1.3.3 option

*static-binding-mode commands*

Configures the raw DHCP options in the DHCP policy. The DHCP options can be used only in static bindings.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
option <OPTION-NAME> [ <DHCP-OPTION-IP> | <DHCP-OPTION-ASCII> ]
```

**Parameters**

- `<OPTION-NAME>` Sets the DHCP option name
- `<DHCP-OPTION-IP>` Sets the DHCP option as an IP address
- `<DHCP-OPTION-ASCII>` Sets the DHCP option as an ASCII string

**Usage Guidelines**

Defines non standard DHCP option codes (0-254)

```
NOTE: An option name in ASCII format accepts a backslash (\) as an input, but is not displayed in the output (Use `show running config` to view the output). Use a double backslash to represent a single backslash.
```

**Examples**

```
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#option option1 172.16.10.10
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context
  static-binding client-identifier test
  client-name RFID
  domain-name documentation
  netbios-node-type b-node
  netbios-name-server 172.16.10.23
  next-server 172.16.10.24
  option option1 172.16.10.10
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#
```
12.1.3.3.34 respond-via-unicast

*static-binding-mode commands*

Sends a DHCP offer and DHCP acknowledge as unicast messages

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

respond-via-unicast

**Parameters**

None

**Examples**

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#respond-via-unicast

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context
  static-binding client-identifier test
  client-name RFID
  domain-name documentation
  netbios-node-type b-node
  netbios-name-server 172.16.10.23
  next-server 172.16.10.24
  option option1 172.16.10.10
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#

**Related Commands**

| no | Resets values or disables DHCP pool static binding settings |
12.1.3.3.35 static-route

`static-binding-mode commands`

Adds static routes to the static binding configuration

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`static-route <IP/MASK> <GATEWAY-IP>`

**Parameters**

- `static-route <IP/MASK> <GATEWAY-IP>`

<table>
<thead>
<tr>
<th>&lt;IP/MASK&gt;</th>
<th>Sets the subnet for which the static route is configured</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;GATEWAY-IP&gt;</td>
<td>Specify the gateway’s IP address</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-1)#static-route 10.0.0.0/10 157.235.208.235
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context
  static-binding client-identifier test
  client-name RFID
  domain-name documentation
  netbios-node-type b-node
  netbios-name-server 172.16.10.23
  next-server 172.16.10.24
  option option1 172.16.10.10
  respond-via-unicast
  static-route 10.0.0.0/10 157.235.208.235
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#
```

**Related Commands**

- `no` | Resets values or disables DHCP pool static route settings |
12.1.4 dhcp-server

- dhcp-server-policy

Configures the activation-criteria (run-criteria) that triggers dynamic activation of DHCP service running on a redundancy device

In a managed wireless network, when the primary, active DHCP server fails (is unreachable), network clients are unable to access DHCP services, such as new IP address leasing and renewal of existing IP address leases. In such a scenario, the activation-criteria, when configured, triggers dynamic activation of the secondary DHCP server, allowing network clients to continue accessing DHCP services. The WiNG implementation provides activation-criteria options specific to a RF Domain, cluster setup, and a Virtual Router Redundancy Protocol (VRRP) master/client setup.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

dhcp-server activation-criteria [cluster-master|rf-domain-manager|vrrp-master]

Parameters

- dhcp-server activation-criteria [cluster-master|rf-domain-manager|vrrp-master]

<table>
<thead>
<tr>
<th>dhcp-server</th>
<th>Enables dynamic activation of the DHCP server, running on a redundancy device, based on the activation criteria specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>activation-criteria [cluster-master</td>
<td>rf-domain-manager</td>
</tr>
<tr>
<td>- cluster-master – Configures the cluster-master criteria in a cluster setup. Within a cluster, DHCP service is enabled on the cluster master. While it remains disabled on the other cluster members. In case of the cluster master failing, the cluster-master activation criteria, when configured, triggers dynamic activation of DHCP service on the new cluster master.</td>
<td></td>
</tr>
<tr>
<td>- rf-domain-manager – Configures the rf-domain-manager criteria on an RF Domain. Within a RF Domain, DHCP service is enabled on the RF Domain manager. While it remains disabled on the other devices within the RF Domain. In case of the RF Domain manager failing, the rf-domain-manager activation criteria, when configured, triggers dynamic activation of DHCP service on the new RF Domain manager.</td>
<td></td>
</tr>
<tr>
<td>- vrrp-master – Configures the vrrp-master criteria within a VRRP master/client setup. In such a setup, the DHCP service is enabled on the VRRP master. While it remains disabled on the other members. In case of the VRRP master failing, the vrrp-master activation criteria, when configured, triggers dynamic activation of DHCP service on the new VRRP master.</td>
<td></td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58(config-dhcp-policy-test)#dhcp-server activation-criteria rf-domain-manager

rfs4000-229D58(config-dhcp-policy-test)#show context
dhcp-server-policy test
  dhcp-server activation-criteria rf-domain-manager
rfs4000-229D58(config-dhcp-policy-test)#

rfs4000-229D58(config-dhcp-policy-test)#no dhcp-server activation-criteria
rfs4000-229D58(config-dhcp-policy-test)#show context
dhcp-server-policy test
rfs4000-229D58(config-dhcp-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the DHCP service activation criteria configured on this DHCP server policy</td>
</tr>
</tbody>
</table>
12.1.5 no

Negates a command or sets its default. When used in the DHCP server configuration context, the 'no' command resets or reverts the DHCP server policy settings.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [bootp|dhcp-class|dhcp-pool|dhcp-server|option|ping]

no bootp ignore
no dhcp-class <DHCP-CLASS-NAME>
no dhcp-pool <DHCP-POOL-NAME>
no dhcp-server activation-criteria
no option <DHCP-OPTION>
no ping timeout

Parameters

- no <PARAMETERS>

Examples

The following example shows the DHCP policy 'test' settings before the 'no' commands are executed:

rfs7000-37FABE(config-dhcp-policy-test)#show context
dhcp-server-policy test
  bootp ignore
  dhcp-class dhcpclass1
dhcp-pool pool1
  address 1.2.3.4 class dhcpclass1
  update dns override
  --More--
rfs7000-37FABE(config-dhcp-policy-test)#

rfs7000-37FABE(config-dhcp-policy-test)# no bootp ignore
rfs7000-37FABE(config-dhcp-policy-test)# no dhcp-class dhcpclass1
rfs7000-37FABE(config-dhcp-policy-test)# no dhcp-pool pool1

The following example shows the DHCP policy 'test' settings after the 'no' commands are executed:

rfs7000-37FABE(config-dhcp-policy-test)#show context
dhcp-server-policy test
rfs7000-37FABE(config-dhcp-policy-test)#
12.1.6 option

dhcp-server-policy

Configures raw DHCP options. The DHCP option has to be configured in the DHCP server policy. The options configured in the DHCP pool/DHCP server policy can also be used in static bindings.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

`option <OPTION-NAME> <0-254> [ascii|hexstring|ip]`

Parameters

- `<OPTION-NAME>` Configures the option name
- `<0-254>` Configures the DHCP option code from 0 - 254
- `ascii` Configures the DHCP option as an ASCII string
- `hexstring` Configures the DHCP option as a hexadecimal string
- `ip` Configures the DHCP option as an IP address

Usage Guidelines

Defines non standard DHCP option codes (0-254)

**NOTE:** An option name in ASCII format accepts a backslash (\) as an input, but is not displayed in the output (Use `show running config` to view the output). Use a double backslash to represent a single backslash.

Examples

```
rfs700-37FABE(config-dhcp-policy-test)#option option1 200 ascii
rfs700-37FABE(config-dhcp-policy-test)#show context dhcp-server-policy test
option option1 200 ascii
rfs700-37FABE(config-dhcp-policy-test)#
```

Related Commands

- `no` Removes DHCP server options
12.1.7 ping

dhcp-server-policy

Configures the DHCP server’s ping timeout interval. The controller uses the timeout to intermittently ping and discover whether a client requested IP address is available or in use.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ping timeout <1-10>

Parameters

- ping timeout <1-10>

| timeout <1-10> | Sets the ping timeout from 1 - 10 seconds. The default is 1 second. |

Examples

rfs7000-37FABE(config-dhcp-policy-test)#ping timeout 2
rfs7000-37FABE(config-dhcp-policy-test)#show context
dhcp-server-policy test
  ping timeout 2
  option option1 200 ascii
rfs7000-37FABE(config-dhcp-policy-test)#

Related Commands

- no | Resets the ping interval to 1 second |
12.2 dhcpv6-server-policy

DHCPv6 is a networking protocol for configuring IPv6 hosts with IP addresses, IP prefixes or other configuration attributes required on an IPv6 network.

DHCPv6 servers pass IPv6 network addresses to IPv6 clients. The DHCPv6 address assignment feature manages non-duplicate addresses in the correct prefix based on the network where the host is connected. Assigned addresses can be from one or multiple pools. Additional options, such as the default domain and DNS name-server address, can be passed back to the client. Address pools can be assigned for use on a specific interface or on multiple interfaces, or the server can automatically find the appropriate pool.

The following table summarizes DHCPv6 server policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcpv6-pool</td>
<td>Creates a DHCPv6 pool and enters its configuration mode</td>
<td>page 12-60</td>
</tr>
<tr>
<td>option</td>
<td>Configures this DHCPv6 server policy’s DHCP option settings, such as enterprise (vendor ID)</td>
<td>page 12-71</td>
</tr>
<tr>
<td>restrict-vendor-options</td>
<td>Restricts the use of vendor-specific DHCP options on this DHCPv6 server policy</td>
<td>page 12-73</td>
</tr>
<tr>
<td>server-preference</td>
<td>Configures this DHCP server’s preference value. This value is sent in DHCP server replies to the IPv6 client.</td>
<td>page 12-74</td>
</tr>
<tr>
<td>no</td>
<td>Negates or reverts this DHCPv6 server policy’s settings</td>
<td>page 12-75</td>
</tr>
</tbody>
</table>
12.2.1 dhcpv6-pool

The following table summarizes DHCPv6 pool configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcpv6-pool</td>
<td>Creates a DHCPv6 pool and enters its configuration mode</td>
<td>page 12-61</td>
</tr>
<tr>
<td>dhcpv6-pool-mode commands</td>
<td>Summarizes DHCPv6 pool configuration mode commands</td>
<td>page 12-63</td>
</tr>
</tbody>
</table>
12.2.1.1 **dhcpv6-pool**

**dhcpv6-pool**

Configures a DHCPv6 server address pool and enters its configuration mode.

A DHCPv6 IPv6 pool is a resource from which IPv6 formatted addresses can be issued on DHCPv6 client requests. IPv6 addresses are composed of eight groups of four hexadecimal digits separated by colons.

**Supported in the following platforms:**

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
dhcpv6-pool <POOL-NAME>
```

**Parameters**

- `dhcpv6-pool <POOL-NAME>`

**<POOL-NAME>**

- Creates a DHCPv6 server address pool
- **<POOL-NAME>** — Specify a name that appropriately identifies this DHCPv6 address pool. If the pool does not exist, it is created. The pool name cannot be modified as part of the edit process. However, an obsolete address pool can be deleted.

**Examples**

```plaintext
rfs7000-37FABE(config-dhcpv6-server-policy-test)#dhcpv6-pool DHCPv6Pool1

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#?
DHCPv6 pool Mode commands:
dns-server DNS Servers
domain-name Configure domain-name
network Network on which DHCPv6 server will be deployed
no Negate a command or set its defaults
option Raw DHCPv6 options
refresh-time Upper limit specifying the timer for which client should wait before refreshing information
sip SIP server options
clear Clear user's display
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#show context
dhcpv6-pool DHCPv6Pool1
network 2002::/64
domain-name TechPubs
sip domain-name TechPubsSIP
dns-server 2002::1
rfs7000-37FABE(config-dhcpv6-server-policy-test)#
```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>no</em></td>
<td>Removes the DHCPv6 pool identified by the <code>&lt;POOL-NAME&gt;</code> keyword</td>
</tr>
</tbody>
</table>
12.2.1.2 dhcpv6-pool-mode commands

`dhcpv6-pool`

Configures the DHCPv6 pool parameters.

The following table summarizes DHCPv6 pool configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>dns-server</code></td>
<td>Configures this DHCPv6 pool's DNS server</td>
<td>page 12-64</td>
</tr>
<tr>
<td><code>domain-name</code></td>
<td>Configures this DHCPv6 pool's domain name</td>
<td>page 12-65</td>
</tr>
<tr>
<td><code>network</code></td>
<td>Configures this DHCPv6 pool's network</td>
<td>page 12-66</td>
</tr>
<tr>
<td><code>option</code></td>
<td>Configures this DHCPv6 pool's raw DHCPv6 options. This is the vendor-specific option used in this DHCPv6 pool.</td>
<td>page 12-68</td>
</tr>
<tr>
<td><code>refresh-time</code></td>
<td>Configures this DHCPv6 pool’s refresh time in seconds</td>
<td>page 12-69</td>
</tr>
<tr>
<td><code>sip</code></td>
<td>Configures this DHCPv6 pool’s Session Initiation Protocol (SIP) server setting</td>
<td>page 12-70</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negates or reverts this DHCPv6 pool’s settings</td>
<td>page 12-67</td>
</tr>
</tbody>
</table>
12.2.1.2.36 dns-server

**dhcpv6-pool-mode commands**

Configures this DHCPv6 pool's DNS server. The DNS server supports all clients connected to networks supported by the DHCPv6 server.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

dns-server <IPv6> {<SECONDARY-IPv6>}

**Parameters**

- dns-server <IPv6> {<SECONDARY-IPv6>}

| <IPv6> | Configures the primary DNS server’s IPv6 address  
|<SECONDARY-IPv6> | Configures the secondary DNS server’s IPv6 address  
|<SECONDARY-IPv6> |  
|<SECONDARY-IPv6> | Specify the DNS server’s IPv6 address (the server associated with this DHCP pool).  
|<SECONDARY-IPv6> | Specify the secondary DNS server’s IPv6 address (the server associated with this DHCP pool).  

**Examples**

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#dns-server 2002::1
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#show context
dhcpv6-pool DHCPv6Pool1
   dns-server 2002::1
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#

**Related Commands**

| no | Removes this DHCPv6 pool’s configured DNS server settings |
12.2.1.2.37 domain-name

- `dhcpv6-pool-mode commands`

Configures this DHCPv6 pool's domain name

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX5520, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

domain-name <DOMAIN-NAME>

**Parameters**

- domain-name <DOMAIN-NAME>

<table>
<thead>
<tr>
<th>&lt;DOMAIN-NAME&gt;</th>
<th>Specify the DHCP pool’s hostname or hostnames of the domain or domains</th>
</tr>
</thead>
</table>

**Examples**

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#domain-name TechPubs

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#show context
dhcpv6-pool DHCPv6Pool1
domain-name TechPubs
dns-server 2002::1
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#

**Related Commands**

no — Removes this DHCPv6 pool's domain name
12.2.1.2.38 network

**dhcpv6-pool-mode commands**

Configures this DHCPv6 pool’s network. Use this command to configure the address of the network on which this DHCP server is deployed.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
network [<IPv6/M>|<NETWORK-ALIAS-NAME>]
```

**Parameters**

- `<IPv6/M>` Specify this DHCPv6 pool network’s IPv6 address and mask (for example, 1:2::0/96)
- `<NETWORK-ALIAS-NAME>` Specify this DHCPv6 pool network’s alias name

**Examples**

```
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#network 2002::/64
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#show context
dhcpv6-pool DHCPv6Pool1
   network 2002::/64
domain-name TechPubs
dns-server 2002::1
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#
```

**Related Commands**

- `no` Removes the network IPv6 address and mask configured for this DHCPv6 pool
12.2.1.2.39 no

> dhcpv6-pool-mode commands

Negates a command or sets its default. When used in the DHCPv6 pool configuration context, the ‘no’ command resets or reverts the DHCPv6 pool’s settings.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [dns-server|domain-name|network|option|refresh-time|sip]

Parameters

- no <PARAMETERS>

---

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Negates a command or sets its default. When used in the DHCPv6 pool configuration context, the ‘no’ command resets or reverts the DHCPv6 pool’s settings.</th>
</tr>
</thead>
</table>

Examples

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#show context
dhcpv6-pool DHCPv6Pool1
  network 2002::/64
  **refresh-time 1000**
  domain-name TechPubs
  sip domain-name TechPubsSIP
dns-server 2002::1
  **option DHCPv6Pool1Option 60**
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#no option DHCPv6Pool1Option
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#no refresh-time

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#show context
dhcpv6-pool DHCPv6Pool1
  network 2002::/64
domain-name TechPubs
  sip domain-name TechPubsSIP
dns-server 2002::1
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#
12.2.1.2.40 option

* dhcpv6-pool-mode commands

Configures this DHCPv6 pool’s raw DHCPv6 options. This is the vendor-specific option used in this DHCPv6 pool.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6523, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
option <OPTION-NAME> [ <DHCPv6-OPTION-IP> | <DHCPv6-OPTION-ASCII> ]
```

**Parameters**

- `option <OPTION-NAME> [ <DHCPv6-OPTION-IP> | <DHCPv6-OPTION-ASCII> ]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;OPTION-NAME&gt;</code></td>
<td>Sets the name of the DHCPv6 option</td>
</tr>
<tr>
<td><code>&lt;DHCPv6-OPTION-IP&gt;</code></td>
<td>Sets DHCPv6 option as an IPv6 address</td>
</tr>
<tr>
<td><code>&lt;DHCPv6-OPTION-ASCII&gt;</code></td>
<td>Sets DHCPv6 option as an ASCII string</td>
</tr>
</tbody>
</table>

**NOTE:** An option name in ASCII format accepts backslash (\) as an input but is not displayed in the output (Use `show running config` to view the output). Use a double backslash to represent a single backslash.

**Examples**

```
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#option DHCPv6Pool1Option 60

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#show context dhcpv6-pool DHCPv6Pool1
network 2002::/64
domain-name TechPubs
dns-server 2002::1
option DHCPv6Pool1Option 60
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes this DHCPv6 pool’s DHCP option settings</td>
</tr>
</tbody>
</table>

12.2.1.2.41 refresh-time

dhcpv6-pool-mode commands

Configures this DHCPv6 pool's refresh time in seconds. This is the interval between two successive DHCP pool refreshes. The DHCP refresh process refreshes IPv6 client information.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
refresh-time <600-4294967295>

Parameters
- refresh-time <600-4294967295>

| refresh-time <600-4294967295> | Specify this DHCPv6 pool's refresh time from 600 - 4294967295 seconds. |

Examples
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#refresh-time 1000

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#show context
dhcpv6-pool DHCPv6Pool1
  network 2002::/64
  refresh-time 1000
  domain-name TechPubs
dns-server 2002::1
  option DHCPv6Pool1Option 60
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#

Related Commands
- no Removes or reverts the configured DHCPv6 pool's refresh time
12.2.1.2.42 sip

- dhcpv6-pool-mode commands

Configures this DHCPv6 pool’s Session Initiation Protocol (SIP) server setting

Configures the domain name or domain names associated with the SIP servers. The SIP server is used to prioritize voice and video traffic on the network. SIP is an application-layer control protocol that can establish, modify and terminate multimedia sessions or calls. A SIP system has several components (user agents, proxy servers, redirect servers, and registrars). User agents can contain SIP clients; proxy servers always contain SIP clients.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
sip [address <IPv6>|domain-name <DOMAIN-NAME>]
```

Parameters

- `sip [address <IPv6>|domain-name <DOMAIN-NAME>]`

| sip [address | Configures the SIP server's setting, such as address and/or domain name |
| <IPv6>|domain-name <DOMAIN-NAME>] |

Examples

```
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#sip domain-name TechPubs SIP
```

```
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#show context dhcpv6-pool DHCPv6Pool1
network 2002::/64
refresh-time 1000
domain-name TechPubs
sip domain-name TechPubs SIP
dns-server 2002::1
option DHCPv6Pool1Option 60
```

```
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#
```

Related Commands

```
no
```

Removes this DHCPv6 pool's SIP server setting
12.2.2 option

 dhcpv6-server-policy

Configures this DHCPv6 server policy’s DHCP option settings, such enterprise (vendor) ID

DHCPv6 services are available for specific IP interfaces. A pool (or range) of IPv6 network addresses and DHCPv6 options can be created for each IPv6 interface defined. This range of addresses can be made available to DHCPv6 enabled devices on either a permanent or leased basis. DHCPv6 options are provided to each client with a DHCPv6 response and provide DHCPv6 clients information required to access network resources (default gateway, domain name, DNS server and WINS server configuration). An option exists to identify the vendor and functionality of a DHCPv6 client. The information is a variable-length string of characters (or octets) with a meaning specified by the vendor of the DHCPv6 client.

Supported in the following platforms:

• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533

• Wireless Controllers — RFS4000, RFS6000, RFS7000

• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

option <OPTION-NAME> <0-254> [ascii|hexstring|ipv6] <1-4294967295>

Parameters

• option <OPTION-NAME> <0-254> [ascii|hexstring|ipv6] <1-4294967295>

<table>
<thead>
<tr>
<th>option &lt;OPTION-NAME&gt;</th>
<th>Specify a unique name for this DHCP option. The name should describe option's function.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-254&gt;</td>
<td>Specify a DHCP option code for this option.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-254&gt; – Specify a value from 0 - 254.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The system allows only one code, of the same value, for each DHCP option used in each DHCPv6 server policy.</td>
</tr>
<tr>
<td>ascii</td>
<td>Specifies the option type as ASCII (sends an ASCII compliant string to the client)</td>
</tr>
<tr>
<td>hexstring</td>
<td>Specifies the option type as a string of hexadecimal characters (sends a hexadecimal string to the client)</td>
</tr>
<tr>
<td>ipv6</td>
<td>Specifies the option type as IPv6 address (sends an IPv6 compatible address to the client)</td>
</tr>
<tr>
<td>&lt;1-4294967295&gt;</td>
<td>This parameter is common to all option types.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4294967295&gt; – Specifies the enterprise (vendor) ID. Specify a value from 1 - 4294967295. The option code (1) is reserved for subnet-mask and cannot be used.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Each vendor should have a unique vendor ID used by the DHCP server to issue vendor-specific DHCP options.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-dhcpv6-server-policy-test)#option DHCPServerOption1 10 ascii 50
rfs7000-37FABE(config-dhcpv6-server-policy-test)#show context
dhcpv6-server-policy test
option DHCPServerOption1 10 ascii 50

dhcpv6-pool DHCPv6Pool1
  network 2002::/64
  domain-name TechPubs
  sip domain-name TechPubsSIP
dns-server 2002::1
rfs7000-37FABE(config-dhcpv6-server-policy-test)#
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the DHCPv6 server option settings configured for this DHCPv6 server policy</td>
</tr>
</tbody>
</table>
12.2.3 restrict-vendor-options

Restricts the use of vendor-specific DHCP options on this DHCPv6 server policy. When restricted, vendor-specific DHCP options, configured on this DHCPv6 server policy, are not included in the DHCPv6 server replies to IPv6 clients.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
restrict-vendor-options

Parameters
None

Examples

rfs7000-37FABE(config-dhcpv6-server-policy-test)#restrict-vendor-options
rfs7000-37FABE(config-dhcpv6-server-policy-test)#show context
dhcpv6-server-policy test
  option DHCPServerOption1 10 ascii 50
dhcpv6-pool DHCPv6Pool1
    network 2002::/64
    domain-name TechPubs
    sip domain-name TechPubsSIP
dns-server 2002::1
  restrict-vendor-options
rfs7000-37FABE(config-dhcpv6-server-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes restriction on sending of vendor-specific options in DHCPv6 server replies to IPv6 clients</td>
</tr>
</tbody>
</table>
12.2.4 server-preference

Configures this DHCPv6 server’s preference value. When configured, the server preference value is included in the DHCPv6 server’s replies to IPv6 clients.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

server-preference <0-255>

Parameters

- server-preference <0-255>

<table>
<thead>
<tr>
<th>server-preference &lt;0-255&gt;</th>
<th>Configures this DHCP server’s preference value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;0-255&gt; – Specify a value from 0 - 255.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-dhcpv6-server-policy-test)#server-preference 1

rfs7000-37FABE(config-dhcpv6-server-policy-test)#show context
dhcpv6-server-policy test
option DHCPServerOption1 10 ascii 50
dhcpv6-pool DHCPv6Pool1
   network 2002::/64
domain-name TechPubs
   sip domain-name TechPubsSIP
dns-server 2002::1
server-preference 1
restrict-vendor-options
rfs7000-37FABE(config-dhcpv6-server-policy-test)#

Related Commands

| no | Removes this DHCPv6 server’s preference value |
12.2.5 no

dhcpv6-server-policy

Negates or reverts this DHCPv6 server policy's settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [dhcpv6-pool|option|restrict-vendor-options|server-preference]

Parameters

- no <PARAMETERS>

Examples

rfs7000-37FABE(config-dhcpv6-server-policy-test)#show context
dhcpv6-server-policy test
   option DHCPServerOption1 10 ascii 50
dhcpv6-pool DHCPv6Pool1
       network 2002::/64
       domain-name TechPubs
       sip domain-name TechPubsSIP
dns-server 2002::1
   server-preference 1
   restrict-vendor-options
rfs7000-37FABE(config-dhcpv6-server-policy-test)#

rfs7000-37FABE(config-dhcpv6-server-policy-test)#no restrict-vendor-options
rfs7000-37FABE(config-dhcpv6-server-policy-test)#no server-preference

rfs7000-37FABE(config-dhcpv6-server-policy-test)#show context
dhcpv6-server-policy test
   option DHCPServerOption1 10 ascii 50
dhcpv6-pool DHCPv6Pool1
       network 2002::/64
       domain-name TechPubs
       sip domain-name TechPubsSIP
dns-server 2002::1
rfs7000-37FABE(config-dhcpv6-server-policy-test)#
CHAPTER 13
FIREWALL-POLICY

This chapter summarizes the firewall policy commands in the CLI command structure.

A firewall protects a network from attacks and unauthorized access from outside the network. Simultaneously, it allows authorized users to access required resources. Firewalls work on multiple levels. Some work at layers 1, 2 and 3 to inspect each packet. The packet is either passed, dropped or rejected based on rules configured on the firewall.

Firewalls use application layer filtering to enforce compliance. These firewalls can understand applications and protocols and can detect if an unauthorized protocol is being used, or an authorized protocol is being abused in any malicious way.

The third set of firewalls, ‘Stateful Firewalls’, consider the placement of individual packets within each packet in the series of packets being transmitted. If there is a packet that does not fit into the sequence, it is automatically identified and dropped.

Use (config) instance to configure firewall policy commands. To navigate to the `config-fw-policy` instance, use the following commands:

```
<DEVICE>(config)#firewall-policy <POLICY-NAME>
rfs7000-37FABE(config)#firewall-policy test
rfs7000-37FABE(config-fw-policy-test)#?
```

Firewall policy Mode commands:

- `acl-logging` Log on flow creating traffic
- `alg` Enable ALG
- `clamp` Clamp value
- `dhcp-offer-convert` Enable conversion of broadcast dhcp offers to unicast
- `dns-snoop` DNS Snooping
- `firewall` Wireless firewall
- `flow` Firewall flow
- `ip` Internet Protocol (IP)
- `ip-mac` Action based on ip-mac table
- `ipv6` Internet Protocol version 6 (IPv6)
- `ipv6-mac` Action based on ipv6-mac table
- `logging` Firewall enhanced logging
- `no` Negate a command or set its defaults
- `proxy-arp` Enable generation of ARP responses on behalf of another device
- `proxy-nd` Enable generation of ND responses (for IPv6) on behalf of another device
- `stateful-packet-inspection-l2` Enable stateful packet inspection in layer2 firewall
- `storm-control` Storm-control
- `virtual-defragmentation` Enable virtual defragmentation for IPv4 packets (recommended for proper functioning
of firewall)

clrscr                      Clears the display screen
commit                      Commit all changes made in this session
do                          Run commands from Exec mode
do                          Run commands from EXEC mode
do                          Run commands from Exec mode and change to EXEC mode
end                          End current mode and change to EXEC mode
exit                         End current mode and down to previous mode
help                         Description of the interactive help system
revert                       Revert changes
service                      Service Commands
show                         Show running system information
write                        Write running configuration to memory or terminal

rfs7000-37FABE(config-fw-policy-test)#

NOTE: The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
13.1 firewall-policy

The following table summarizes default firewall policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>acl-logging</td>
<td>Enables logging on flow creating traffic</td>
<td>page 13-4</td>
</tr>
<tr>
<td>alg</td>
<td>Enables an algorithm</td>
<td>page 13-5</td>
</tr>
<tr>
<td>clamp</td>
<td>Sets a clamp value to limit TCP MSS to inner path-MTU for tunneled packets</td>
<td>page 13-7</td>
</tr>
<tr>
<td>dhcp-offer-convert</td>
<td>Enables the conversion of broadcast DHCP offers to unicast</td>
<td>page 13-8</td>
</tr>
<tr>
<td>dns-snoop</td>
<td>Sets the timeout value for DNS entries</td>
<td>page 13-9</td>
</tr>
<tr>
<td>firewall</td>
<td>Configures the wireless firewall</td>
<td>page 13-10</td>
</tr>
<tr>
<td>flow</td>
<td>Defines a session flow timeout</td>
<td>page 13-11</td>
</tr>
<tr>
<td>ip</td>
<td>Configures Internet Protocol (IP) components on this firewall policy</td>
<td>page 13-13</td>
</tr>
<tr>
<td>ip-mac</td>
<td>Defines an action based on IP-MAC table</td>
<td>page 13-20</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures IPv6 components on this firewall policy</td>
<td>page 13-23</td>
</tr>
<tr>
<td>ipv6-mac</td>
<td>Defines an action based on IPv6-MAC table</td>
<td>page 13-26</td>
</tr>
<tr>
<td>logging</td>
<td>Enables enhanced firewall logging</td>
<td>page 13-28</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 13-30</td>
</tr>
<tr>
<td>proxy-arp</td>
<td>Enables the generation of ARP responses on behalf of another device</td>
<td>page 13-32</td>
</tr>
<tr>
<td>proxy-nd</td>
<td>Enables the generation of ND responses (for IPv6) on behalf of another device</td>
<td>page 13-33</td>
</tr>
<tr>
<td>stateful-packet-inspection-12</td>
<td>Enables stateful packets-inspection in layer 2 firewall</td>
<td>page 13-34</td>
</tr>
<tr>
<td>storm-control</td>
<td>Defines storm control and logging settings</td>
<td>page 13-35</td>
</tr>
<tr>
<td>virtual-defragmentation</td>
<td>Enables virtual defragmentation of IPv4 packets</td>
<td>page 13-37</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
13.1.1 acl-logging

- **firewall-policy**

Enables logging on flow creating traffic

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
acl-logging
```

**Parameters**

None

**Examples**

```
rfs4000-229D58(config-fw-policy-test)#acl-logging
rfs4000-229D58(config-fw-policy-test)#no acl-logging
```

```
rfs4000-229D58(config-fw-policy-test)#show context firewall-policy test
 no ip dos tcp-sequence-past-window
     no acl-logging
rfs4000-229D58(config-fw-policy-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables logging on flow creating traffic</td>
</tr>
</tbody>
</table>
### 13.1.2 alg

#### firewall-policy

Enables traffic filtering at the application layer using the Application Layer Gateway (ALG) feature.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
alg [dns|facetime|ftp|pptp|sccp|sip|tftp]
```

#### Parameters

- `alg [dns|facetime|ftp|pptp|sccp|sip|tftp]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>alg</td>
<td>Enables traffic filtering at the application layer. The ALG provides filters for the following common protocols: DNS, Facetime, FTP, PPTP, SCCP, SIP, and TFTP.</td>
</tr>
<tr>
<td>dns</td>
<td>Allows Domain Name System (DNS) traffic through the firewall using its default ports. This option is enabled by default. When enabled, you can easily permit or deny traffic based on a packet's DNS name, instead of the IP address. Use this option when configuring ACLs allowing or denying traffic for Web sites that have a single domain name resolving to any one of multiple IP addresses.</td>
</tr>
<tr>
<td>facetime</td>
<td>Allows Apple's FaceTime video calling traffic through the firewall using its default ports. This option is enabled by default.</td>
</tr>
<tr>
<td>ftp</td>
<td>Allows File Transfer Protocol (FTP) traffic through the firewall using its default ports. This option is enabled by default.</td>
</tr>
<tr>
<td>pptp</td>
<td>Allows Point-to-Point Tunneling Protocol (PPTP) traffic through the firewall using its default ports. PPTP, a network protocol, enables secure transfer of data from a remote client to an enterprise server by encapsulating PPP packets into IP datagrams for transmission over the Internet or other public TCP/IP-based networks. This option is enabled by default.</td>
</tr>
<tr>
<td>sccp</td>
<td>Allows Signalling Connection Control Part (SCCP) traffic through the firewall using its default ports. This option is disabled by default. SCCP is a network protocol that provides routing, flow control and error correction in telecommunication networks.</td>
</tr>
<tr>
<td>sip</td>
<td>Allows Session Initiation Protocol (SIP) traffic through the firewall using its default ports. This option is enabled by default.</td>
</tr>
<tr>
<td>tftp</td>
<td>Enables the Trivial File Transfer Protocol (TFTP) algorithm. When enabled, allows TFTP traffic through the firewall using its default ports. This option is enabled by default.</td>
</tr>
</tbody>
</table>
Examples

```
nx4500-5CFA2B(config-fw-policy-test)#alg facetime
```

```
nx4500-5CFA2B(config-fw-policy-test)#show context firewall-policy test
  no ip dos tcp-sequence-past-window
  alg facetime
```

nx4500-5CFA2B(config-fw-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes or reverts ALG related settings</td>
</tr>
</tbody>
</table>
13.1.3 clamp

This option limits the TCP Maximum Segment Size (MSS) to the size of the Maximum Transmission Unit (MTU) discovered by path MTU discovery for the inner protocol. This ensures the packet traverses through the inner protocol without fragmentation. This option is enabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
clamp tcp-mss

Parameters
- tcp-mss

| tcp-mss | Limits the TCP MSS size to the MTU value of the inner protocol for tunneled packets |

Examples
rfs7000-37FABE(config-fw-policy-test)#clamp tcp-mss

Related Commands
-no | Disables limiting of the TCP MSS
13.1.4 dhcp-offer-convert

*firewall-policy*

Enables the conversion of broadcast DHCP offers to unicast. Converting DHCP broadcast traffic to unicast traffic can help reduce network traffic loads. This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX5502, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**
dhcp-offer-convert

**Parameters**
None

**Examples**
```
rfs7000-37FABE(config-fw-policy-test)#dhcp-offer-convert
```
```
rfs7000-37FABE(config-fw-policy-test)#show context firewall-policy test
dhcp-offer-convert
```
```
rfs7000-37FABE(config-fw-policy-test)#
```

**Related Commands**

| no | Disables the conversion of broadcast DHCP offers to unicast |
13.1.5 *dns-snoop*

Sets the timeout interval for DNS snoop table entries. DNS snoop entries provide information, such as client to IP address and client to default gateway(s) mappings. This information is used to detect if the client is sending routed packets to a wrong MAC address.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

dns-snoop entry-timeout <30-86400>

**Parameters**

- dns-snoop entry-timeout <30-86400>

| entry-timeout <30-86400> | Sets the DNS snoop table entry timeout interval from 30 - 86400 seconds. An entry is retained in the DNS snoop table only for the specified time, and is deleted once this time is exceeded. The default is 1,800 seconds. |

**Examples**

rfs7000-37FABE(config-fw-policy-test)#dns-snoop entry-timeout 35

rfs7000-37FABE(config-fw-policy-test)#show context

firewall-policy test

no ip dos tcp-sequence-past-window
dhcp-offer-convert
dns-snoop entry-timeout 35

rfs7000-37FABE(config-fw-policy-test)#

**Related Commands**

- no

Removes the DNS snoop table entry timeout interval
13.1.6 firewall

Enables a device’s firewall

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
firewall enable

Parameters

- firewall enable

<table>
<thead>
<tr>
<th>firewall enable</th>
<th>Enables wireless firewalls</th>
</tr>
</thead>
</table>

Examples
rfs7000-37FABE(config-fw-policy-default)#firewall enable
rfs7000-37FABE(config-fw-policy-default)#

Related Commands

no Disables a device’s firewall
13.1.7 flow

Defines the session flow timeout interval for different packet types

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

flow [dhcp|timeout]

flow dhcp stateful

flow timeout [icmp|other|tcp|udp]
flow timeout [icmp|other] <1-32400>
flow timeout udp <15-32400>
flow timeout tcp [close-wait|reset|setup|stateless-fin-or-reset|stateless-general] <1-32400>
flow timeout tcp established <15-32400>

Parameters

- flow dhcp stateful
  dhcp Configures DHCP packet flow
  stateful Performs a stateful check on DHCP packets. This feature is enabled by default.

- flow timeout [icmp|other] <1-32400>
  timeout Configures a packet timeout
  icmp Configures the timeout for ICMP packets. The default is 30 seconds.
  other Configures the timeout for packets other than ICMP, TCP, or UDP. The default is 30 seconds.
  <1-32400> Configures the timeout from 1 - 32400 seconds

- flow timeout udp <15-32400>
  timeout Configures a packet timeout
  udp Configures the timeout for UDP packets. The default is 30 seconds.
  <15-32400> Configures the timeout from 15 - 32400 seconds

- flow timeout tcp [close-wait|reset|setup|stateless-fin-or-reset|stateless-general] <1-32400>
  timeout Configures a packet timeout
  tcp Configures the timeout for TCP packets
  close-wait Configures the closed TCP flow timeout. The default is 10 seconds.
  reset Configures the reset TCP flow timeout. The default is 10 seconds.
  setup Configures the opening TCP flow timeout. The default is 10 seconds.
### Examples

- `rfs7000-37FABE(config-fw-policy-test)#flow timeout udp 10000`
- `rfs7000-37FABE(config-fw-policy-test)#flow timeout icmp 16000`
- `rfs7000-37FABE(config-fw-policy-test)#flow timeout other 16000`
- `rfs7000-37FABE(config-fw-policy-test)#flow timeout tcp established 1500`

- `rfs7000-37FABE(config-fw-policy-test)#show context firewall-policy test
  no ip dos tcp-sequence-past-window
  flow timeout icmp 16000
  flow timeout udp 10000
  flow timeout tcp established 1500
  dhcp-offer-convert
dns-snoop entry-timeout 35`

- `rfs7000-37FABE(config-fw-policy-test)#`

### Related Commands

- `no` Removes session timeout intervals configured for different packet types
13.1.8 ip

Configures Internet Protocol (IP) components

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
ip [dos|tcp]

ip dos {ascend|broadcast-multicast-icmp|chargen|fraggle|ftp-bounce|invalid-protocol|
  ip-ttl-zero|ipsproof|land|option-route|router-advt|router-solicit|smurf|snork|
  tcp-bad-sequence|tcp-fin-scan|tcp-intercept|tcp-max-incomplete|tcp-null-scan|
  tcp-post-syn|tcp-sequence-past-window|tcp-xmas-scan|tcphdrfrag|twinge|
  udp-short-hdr|winnuke}

ip dos {ascend|broadcast-multicast-icmp|chargen|fraggle|ftp-bounce|invalid-protocol|
  ip-ttl-zero|ipsproof|land|option-route|router-advt|router-solicit|smurf|snork|
  tcp-bad-sequence|tcp-fin-scan|tcp-intercept|tcp-null-scan|tcp-post-scan|
  tcp-sequence-past-window|tcp-xmas-scan|tcphdrfrag|twinge|udp-short-hdr|winnuke} [log-and-drop|log-only] log-level [<0-7>|alerts|critical|debugging|emergencies|
  errors| informational| notifications| warnings]

ip dos tcp-max-incomplete [high|low] <1-1000>

ip tcp [adjust-mss|optimize-unnecessary-resends|recreate-flow-on-out-of-state-syn|
  validate-icmp-unreachable|validate-rst-ack-number|validate-rst-seq-number]

ip tcp adjust-mss <472-1460>

ip tcp [optimize-unnecessary-resends|recreate-flow-on-out-of-state-syn|
  validate-icmp-unreachable|validate-rst-ack-number|validate-rst-seq-number]
```

Parameters

- **ip dos** {ascend|broadcast-multicast-icmp|chargen|fraggle|ftp-bounce|invalid-protocol|
  ip-ttl-zero|ipsproof|land|option-route|router-advt|router-solicit|smurf|snork|
  tcp-bad-sequence|tcp-fin-scan|tcp-intercept|tcp-null-scan|tcp-post-scan|
  tcp-sequence-past-window|tcp-xmas-scan|tcphdrfrag|twinge|udp-short-hdr|winnuke} [log-and-drop|log-only] log-level [<0-7>|alerts|critical|debug|emergencies|errors|
  informational|notifications|warnings]

<table>
<thead>
<tr>
<th>dos</th>
<th>Identifies IP events as DoS events</th>
</tr>
</thead>
<tbody>
<tr>
<td>ascend</td>
<td>Optional. Detects ASCEND DoS attacks</td>
</tr>
<tr>
<td></td>
<td>Ascend DoS attacks target known vulnerabilities in various versions of Ascend routers. Ascend routers listen on UDP port 9 for packets from Ascend’s Java Configurator. Sending a formatted packet to this port can cause an Ascend router to crash.</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>broadcast-multicast-icmp</td>
<td>Optional. Detects broadcast or multicast ICMP DoS attacks. Broadcast or multicast ICMP DoS attacks take advantage of ICMP behavior in response to echo replies. These attacks spoof the source address of the target and send ICMP broadcast or multicast echo requests to the rest of the network, flooding the target machine with replies.</td>
</tr>
<tr>
<td>chargen</td>
<td>Optional. Detects Chargen attacks. The Character Generation Protocol (chargen) is an IP suite service primarily used for testing and debugging networks. It is also used as a source of generic payload for bandwidth and QoS measurements. The Chargen attack establishes a Telnet connection to port 19 and attempts to use the character generator service to create a string of characters which is then directed to the DNS service on port 53 to disrupt DNS services.</td>
</tr>
<tr>
<td>fraggle</td>
<td>Optional. Detects Fraggle DoS attacks. The Fraggle DoS attack uses a list of broadcast addresses to send spoofed UDP packets to each broadcast address' echo port (port 7). Each of those addresses that have port 7 open will respond to the request generating a lot of traffic on the network. For those that do not have port 7 open they will send an unreachable message back to the originator, further clogging the network with more traffic.</td>
</tr>
<tr>
<td>ftp-bounce</td>
<td>Optional. Detects FTP bounce attacks. A FTP bounce attack is a MIM attack that enables an attacker to open a port on a different machine using FTP. FTP requires that when a connection is requested by a client on the FTP port (21), another connection must open between the server and the client. To confirm, the PORT command has the client specify an arbitrary destination machine and port for the data connection. This is exploited by the attacker to gain access to a device that may not be the originating client.</td>
</tr>
<tr>
<td>invalid-protocol</td>
<td>Optional. Enables a check for an invalid protocol number. Attackers may use vulnerability in the endpoint implementation by sending invalid protocol fields, or may misuse the misinterpretation of endpoint software. This can lead to inadvertent leakage of sensitive network topology information, call hijacking, or a DoS attack.</td>
</tr>
<tr>
<td>ip-ttl-zero</td>
<td>Optional. Enables a check for the TCP/IP TTL field having a value of zero (0). The TCP IP TTL Zero DoS attack sends spoofed multicast packets onto the network which have a <em>Time to Live</em> (TTL) of 0. This causes packets to loop back to the spoofed originating machine, and can cause the network to overload.</td>
</tr>
<tr>
<td>ipsproof</td>
<td>Optional. Enables a check for the IP spoofing DoS attacks. IP Spoof is a category of DoS attack that sends IP packets with forged source addresses. This can hide the identity of the attacker.</td>
</tr>
<tr>
<td>land</td>
<td>Optional. Detects LAND DoS attacks. A <em>Local Area Network Denial</em> (LAND) is a DoS attack where IP packets are spoofed and sent to a device where the source IP and destination IP of the packet are the target device's IP, and similarly, the source port and destination port are open ports on the same device. This causes the attacked device to reply to itself continuously.</td>
</tr>
<tr>
<td>option-route</td>
<td>Optional. Enables an IP Option Record Route DoS check.</td>
</tr>
</tbody>
</table>
| **router-advt** | Optional. Detects router-advertisement attacks  
This attack uses ICMP to redirect the network router function to some other host. If that host can not provide router services, a DoS of network communications occurs as routing stops. This can also be modified to single out a specific system, so that only that system is subject to attack (because only that system sees the 'false' router). By providing router services from a compromised host, the attacker can also place themselves in a man-in-the-middle situation and take control of any open channel at will (as mentioned earlier, this is often used with TCP packet forgery and spoofing to intercept and change open TELNET sessions). |
| **router-solicit** | Optional. Detects router solicitation attacks  
The ICMP router solicitation scan is used to actively find routers on a network. A hacker could set up a protocol analyzer to detect routers as they broadcast routing information on the network. In some instances, however, routers may not send updates. For example, if the local network does not have other routers, the router may be configured to not send routing information packets onto the local network. ICMP offers a method for router discovery. Clients send ICMP router solicitation multicasts onto the network, and routers must respond (as defined in RFC 1122). By sending ICMP router solicitation packets (ICMP type 9) on the network and listening for ICMP router discovery replies (ICMP type 10), hackers can build a list of all of the routers that exist on a network segment. Hackers often use this scan to locate routers that do not reply to ICMP echo requests. |
| **smurf** | Optional. In this attack, a large number of ICMP echo packets are sent with a spoofed source address. This causes the device with the spoofed source address to be flooded with a large number of replies. |
| **snork** | Optional. This attack causes a remote Windows™ NT to consume 100% of the CPU’s resources. This attack uses a UDP packet with a destination port of 135 and a source port of 7, 9, or 135. This attack can also be exploited as a bandwidth consuming attack. |
| **tcp-bad-sequence** | Optional. A DoS attack that uses a specially crafted TCP packet to cause the targeted device to drop all subsequent network traffic for a specific TCP connection. |
| **tcp-fin-scan** | Optional. Detects TCP FIN scan attacks  
Hackers use the TCP FIN scan to identify listening TCP port numbers based on how the target device reacts to a transaction close request for a TCP port (even though no connection may exist before these close requests are made). This type of scan can get through basic firewalls and boundary routers that filter on incoming TCP packets with the Finish (FIN) and ACK flag combination. The TCP packets used in this scan include only the TCP FIN flag setting. If the target device's TCP port is closed, the target device sends a TCP RST packet in reply. If the target device's TCP port is open, the target device discards the FIN and sends no reply. |
### tcp-intercept
Optional. Prevents TCP intercept attacks by using TCP SYN cookies. A SYN-flooding attack occurs when a hacker floods a server with a barrage of requests for connection. Because these messages have unreachable return addresses, the connections cannot be established. The resulting volume of unresolved open connections eventually overwhelsms the server and can cause it to deny service to valid requests, thereby preventing legitimate users from connecting to a Web site, accessing e-mail, using FTP service, and so on.

The TCP intercept feature helps prevent SYN-flooding attacks by intercepting and validating TCP connection requests. In intercept mode, the TCP intercept software intercepts TCP synchronization (SYN) packets from clients to servers that match an extended access list. The software establishes a connection with the client on behalf of the destination server, and if successful, establishes the connection with the server on behalf of the client and knits the two half-connections together transparently. Thus, connection attempts from unreachable hosts will never reach the server. The software continues to intercept and forward packets throughout the duration of the connection. The number of SYNs per second and the number of concurrent connections proxied depends on the platform, memory, processor, and other factors. In the case of illegitimate requests, the software's aggressive timeouts on half-open connections and its thresholds on TCP connection requests protect destination servers while still allowing valid requests.

When establishing a security policy using TCP intercept, you can choose to intercept all requests or only those coming from specific networks or destined for specific servers. You can also configure the connection rate and threshold of outstanding connections. Optionally operate TCP intercept in watch mode, as opposed to intercept mode. In watch mode, the software passively watches the connection requests flowing through the router. If a connection fails to get established in a configurable interval, the software intervenes and terminates the connection attempt.

### tcp-null-scan
Optional. Detects TCP NULL scan attacks. Hackers use the TCP NULL scan to identify listening TCP ports. This scan also uses a series of strangely configured TCP packets, which contain a sequence number of 0 and no flags. Again, this type of scan can get through some firewalls and boundary routers that filter incoming TCP packets with standard flag settings.

If the target device's TCP port is closed, the target device sends a TCP RST packet in reply. If the target device’s TCP port is open, the target discards the TCP NULL scan, sending no reply.

### tcp-post-syn
Optional. Detects TCP post SYN DoS attacks. A remote attacker may be attempting to avoid detection by sending a SYN frame with a different sequence number than the original SYN. This can cause an Intrusion Detection System (IDS) to become unsynchronized with the data in a connection. Subsequent frames sent during the connection are ignored by the IDS.

### tcp-sequence-past-window
Optional. Enables a TCP SEQUENCE PAST WINDOW DoS attack check. Disable this check to work around a bug in Windows XP's TCP stack which sends data past the window when conducting a selective ACK.

### tcp-xmas-scan
Optional. A TCP XMAS scan finds services on ports. A closed port returns a RST. This allows the attacker to identify open ports.

### tcphdrfrag
Optional. A DoS attack where the TCP header spans IP fragments

### twinge
Optional. A twinge attack is a flood of false ICMP packets to try and slow down a system.
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>udp-short-hdr</td>
<td>Optional. Enables the identification of truncated UDP headers and UDP header length fields</td>
</tr>
<tr>
<td>winnuke</td>
<td>Optional. This DoS attack is specific to Windows™ 95 and Windows™ NT. The WINNUKE DoS attack sends a large amount of data to UDP port 137 to crash the NETBIOS service on windows and results in high CPU utilization on the target machine.</td>
</tr>
<tr>
<td>log-and-drop</td>
<td>Logs the event and drops the packet</td>
</tr>
<tr>
<td>log-only</td>
<td>Logs the event only, the packet is not dropped</td>
</tr>
<tr>
<td>log-level</td>
<td>Configures the log level</td>
</tr>
<tr>
<td>&lt;0-7&gt;</td>
<td>Sets the numeric logging level</td>
</tr>
<tr>
<td>emergencies</td>
<td>Numerical severity 0. System is unusable</td>
</tr>
<tr>
<td>alerts</td>
<td>Numerical severity 1. Indicates a condition where immediate action is required</td>
</tr>
<tr>
<td>critical</td>
<td>Numerical severity 2. Indicates a critical condition</td>
</tr>
<tr>
<td>errors</td>
<td>Numerical severity 3. Indicates an error condition</td>
</tr>
<tr>
<td>warnings</td>
<td>Numerical severity 4. Indicates a warning condition</td>
</tr>
<tr>
<td>notification</td>
<td>Numerical severity 5. Indicates a normal but significant condition</td>
</tr>
<tr>
<td>informational</td>
<td>Numerical severity 6. Indicates an informational condition</td>
</tr>
<tr>
<td>debugging</td>
<td>Numerical severity 7. Debugging messages</td>
</tr>
<tr>
<td>dos</td>
<td>Identifies IP events as DoS events</td>
</tr>
<tr>
<td>ascend</td>
<td>Optional. Enables an ASCEND DoS check. Ascend routers listen on UDP port 9 for packets from Ascend's Java Configurator. Sending a formatted packet to this port can cause an Ascend router to crash.</td>
</tr>
<tr>
<td>broadcast-multicast-icmp</td>
<td>Optional. Detects broadcast or multicast ICMP packets as an attack</td>
</tr>
<tr>
<td>chargen</td>
<td>Optional. The Character Generation Protocol (chargen) is an IP suite service primarily used for testing and debugging networks. It is also used as a source of generic payload for bandwidth and QoS measurements.</td>
</tr>
<tr>
<td>fraggle</td>
<td>Optional. A Fraggle DoS attack checks for UDP packets to or from port 7 or 19</td>
</tr>
<tr>
<td>ftp-bounce</td>
<td>Optional. A FTP bounce attack is a MIM attack that enables an attacker to open a port on a different machine using FTP. FTP requires that when a connection is requested by a client on the FTP port (21), another connection must open between the server and the client. To confirm, the PORT command has the client specify an arbitrary destination machine and port for the data connection. This is exploited by the attacker to gain access to a device that may not be the originating client.</td>
</tr>
<tr>
<td>invalid-protocol</td>
<td>Optional. Enables a check for invalid protocol number</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ip-ttl-zero</td>
<td>Optional. Enables a check for the TCP/IP TTL field having a value of zero (0)</td>
</tr>
<tr>
<td>ipsproof</td>
<td>Optional. Enables a check for IP spoofing DoS attack</td>
</tr>
<tr>
<td>land</td>
<td>Optional. A <em>Local Area Network Denial</em> (LAND) is a DoS attack where IP packets are spoofed and sent to a device where the source IP and destination IP of the packet are the target device’s IP, and similarly, the source port and destination port are open ports on the same device. This causes the attacked device to reply to itself continuously.</td>
</tr>
<tr>
<td>option-route</td>
<td>Optional. Enables an IP Option Record Route DoS check</td>
</tr>
<tr>
<td>router-advt</td>
<td>Optional. This is an attack, where a default route entry is added remotely to a device. This route entry is given preference, and thereby exposes an attacker.</td>
</tr>
<tr>
<td>router-solicit</td>
<td>Optional. Router solicitation messages are sent to locate routers as a form of network scanning. This information can then be used to attack a device.</td>
</tr>
<tr>
<td>smurf</td>
<td>Optional. In this attack, a large number of ICMP echo packets are sent with a spoofed source address. This causes the device with the spoofed source address to be flooded with a large number of replies.</td>
</tr>
<tr>
<td>snork</td>
<td>Optional. This attack causes a remote Windows™ NT to consume 100% of the CPU’s resources. This attack uses a UDP packet with a destination port of 135 and a source port of 7, 9, or 135. This attack can also be exploited as a bandwidth consuming attack.</td>
</tr>
<tr>
<td>tcp-bad-sequence</td>
<td>Optional. A DoS attack that uses a specially crafted TCP packet to cause the targeted device to drop all subsequent network traffic for a specific TCP connection</td>
</tr>
<tr>
<td>tcp-fin-scan</td>
<td>Optional. A FIN scan finds services on ports. A closed port returns a RST. This allows the attacker to identify open ports.</td>
</tr>
<tr>
<td>tcp-intercept</td>
<td>Optional. Prevents TCP intercept attacks by using TCP SYN cookies</td>
</tr>
<tr>
<td>tcp-null-scan</td>
<td>Optional. A TCP null scan finds services on ports. A closed port returns a RST. This allows the attacker to identify open ports.</td>
</tr>
<tr>
<td>tcp-post-syn</td>
<td>Optional. Enables a TCP post SYN DoS attack</td>
</tr>
<tr>
<td>tcp-sequence-past-window</td>
<td>Optional. Enables a TCP SEQUENCE PAST WINDOW DoS attack check. Disable this check to work around a bug in Windows XP’s TCP stack which sends data past the window when conducting a selective ACK.</td>
</tr>
<tr>
<td>tcp-xmas-scan</td>
<td>Optional. A TCP XMAS scan finds services on ports. A closed port returns a RST. This allows the attacker to identify open ports.</td>
</tr>
<tr>
<td>tcphdrfrag</td>
<td>Optional. A DoS attack where the TCP header spans IP fragments</td>
</tr>
<tr>
<td>twinge</td>
<td>Optional. A twinge attack is a flood of false ICMP packets to try and slow down a system</td>
</tr>
<tr>
<td>udp-short-hdr</td>
<td>Optional. Enables the identification of truncated UDP headers and UDP header length fields</td>
</tr>
<tr>
<td>winnuke</td>
<td>Optional. This DoS attack is specific to Windows™ 95 and Windows™ NT, causing devices to crash with a blue screen</td>
</tr>
<tr>
<td>drop-only</td>
<td>Optional. Drops a packet without logging</td>
</tr>
</tbody>
</table>
- **ip dos tcp-max-incomplete [high|low] <1-1000>**

<table>
<thead>
<tr>
<th>dos</th>
<th>Identifies IP events as DoS events</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcp-max-incomplete</td>
<td>Sets the limits for the maximum number of incomplete TCP connections</td>
</tr>
<tr>
<td>high</td>
<td>Sets the upper limit for the maximum number of incomplete TCP connections</td>
</tr>
<tr>
<td>low</td>
<td>Sets the lower limit for the maximum number of incomplete TCP connections</td>
</tr>
<tr>
<td>&lt;1-1000&gt;</td>
<td>Sets the range limit from 1 - 1000 connections</td>
</tr>
</tbody>
</table>

- **ip tcp adjust-mss <472-1460>**

<table>
<thead>
<tr>
<th>tcp</th>
<th>Identifies and configures TCP events and configuration items</th>
</tr>
</thead>
<tbody>
<tr>
<td>adjust-mss</td>
<td>Adjusts the TCP <em>Maximum Segment Size</em> (MSS). Use this option to adjust the MSS for TCP segments on the router.</td>
</tr>
<tr>
<td>&lt;472-1460&gt;</td>
<td>Sets the TCP MSS value from 472 - 1460 bytes. The default is 472 bytes.</td>
</tr>
</tbody>
</table>

- **ip tcp [optimize-unnecessary-resends|recreate-flow-on-out-of-state-syn|validate-icmp-unreachable|validate-rst-ack-number|validate-rst-seq-number]**

<table>
<thead>
<tr>
<th>tcp</th>
<th>Identifies and configures TCP events and configuration items</th>
</tr>
</thead>
<tbody>
<tr>
<td>optimize-unnecessary-resends</td>
<td>Enables the validation of unnecessary TCP packets</td>
</tr>
<tr>
<td>recreate-flow-on-out-of-state-sync</td>
<td>Allows a TCP SYN packet to delete an old flow in TCP_FIN_FIN_STATE, and TCP_CLOSED_STATE states and create a new flow</td>
</tr>
<tr>
<td>validate-icmp-unreachable</td>
<td>Enables the validation of the sequence number in ICMP unreachable error packets, which abort an established TCP flow</td>
</tr>
<tr>
<td>validate-rst-ack-number</td>
<td>Enables the validation of the acknowledgment number in RST packets, which abort a TCP flow</td>
</tr>
<tr>
<td>validate-rst-seq-number</td>
<td>Enables the validation of the sequence number in RST packets, which abort an established TCP flow</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-rw-policy-test)#ip dos fraggle drop-only
rfs7000-37FABE(config-rw-policy-test)#ip dos tcp-max-incomplete high 600
rfs7000-37FABE(config-rw-policy-test)#ip dos tcp-max-incomplete low 60
rfs7000-37FABE(config-rw-policy-test)#ip dos tcp-sequence-past-window drop-only
rfs7000-37FABE(config-fw-policy-test)#show context firewall-policy test
  ip dos fraggle drop-only
  ip dos tcp-sequence-past-window drop-only
  ip dos tcp-max-incomplete high 600
  ip dos tcp-max-incomplete low 60
  flow timeout icmp 16000
  flow timeout udp 10000
  flow timeout tcp established 1500
  flow timeout other 16000
  dhcp-offer-convert
dns-snoop entry-timeout 35
rfs7000-37FABE(config-fw-policy-test)#

**Related Commands**

**no** Resets firewall policy IP components
### 13.1.9 ip-mac

- **firewall-policy**

Defines an action based on the device IP MAC table, and also detects conflicts between IP addresses and MAC addresses.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```plaintext
ip-mac [conflict|routing]

ip-mac conflict drop-only
ip-mac conflict [log-and-drop|log-only] log-level [<0-7>|alerts|critical|debug|emergencies|errors|informational|notifications|warnings]

ip-mac routing conflict drop-only
ip-mac routing [log-and-drop|log-only] log-level [<0-7>|alerts|critical|debug|emergencies|errors|informational|notifications|warnings]
```

#### Parameters

- **ip-mac conflict drop-only**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>conflict</td>
<td>Action performed when a conflict exists between the IP address and MAC address. This option is enabled by default.</td>
</tr>
<tr>
<td>drop-only</td>
<td>Drops a packet without logging</td>
</tr>
</tbody>
</table>

- **ip-mac conflict [log-and-drop|log-only] log-level [<0-7>|alerts|critical|debug|emergencies|errors|informational|notifications|warnings]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>conflict</td>
<td>Action performed when a conflict exists between the IP address and MAC address. This option is enabled by default.</td>
</tr>
<tr>
<td>log-and-drop</td>
<td>Logs the event and drops the packet. This is the default setting.</td>
</tr>
<tr>
<td>log-only</td>
<td>Logs the event only, the packet is not dropped</td>
</tr>
<tr>
<td>log-level</td>
<td>Configures the log level</td>
</tr>
<tr>
<td>&lt;0-7&gt;</td>
<td>Sets the numeric logging level</td>
</tr>
<tr>
<td>alerts</td>
<td>Numerical severity 1. Indicates a condition where immediate action is required</td>
</tr>
<tr>
<td>critical</td>
<td>Numerical severity 2. Indicates a critical condition</td>
</tr>
<tr>
<td>debugging</td>
<td>Numerical severity 7. Debugging messages</td>
</tr>
<tr>
<td>emergencies</td>
<td>Numerical severity 0. System is unusable</td>
</tr>
<tr>
<td>errors</td>
<td>Numerical severity 3. Indicates an error condition</td>
</tr>
<tr>
<td>informational</td>
<td>Numerical severity 6. Indicates a informational condition</td>
</tr>
<tr>
<td>notification</td>
<td>Numerical severity 5. Indicates a normal but significant condition</td>
</tr>
<tr>
<td>warnings</td>
<td>Numerical severity 4. Indicates a warning condition. This is the default setting</td>
</tr>
</tbody>
</table>
**ip-mac routing conflict drop-only**

<table>
<thead>
<tr>
<th>routing</th>
<th>Enables IP/MAC routing conflict detection. This is also known as a Hole-196 attack in the network. This feature helps to detect if the client is sending routed packets to the correct router-mac-address.</th>
</tr>
</thead>
<tbody>
<tr>
<td>conflict</td>
<td>Defines the action performed when a routing table conflict is detected. This option is enabled by default.</td>
</tr>
<tr>
<td>drop-only</td>
<td>Drops a packet without logging</td>
</tr>
</tbody>
</table>

**ip-mac routing [log-and-drop|log-only] log-level [{0-7}|alerts|critical|debug|emergencies|errors|informational|notifications|warnings]**

<table>
<thead>
<tr>
<th>routing</th>
<th>Defines a routing table based action</th>
</tr>
</thead>
<tbody>
<tr>
<td>conflict</td>
<td>Action performed when a conflict exists in the routing table. This option is enabled by default.</td>
</tr>
<tr>
<td>log-and-drop</td>
<td>Logs the event and drops the packet. This is the default setting.</td>
</tr>
<tr>
<td>log-only</td>
<td>Logs the event only, the packet is not dropped</td>
</tr>
<tr>
<td>log-level</td>
<td>Configures the log level to log this event under</td>
</tr>
<tr>
<td>&lt;0-7&gt;</td>
<td>Sets the numeric logging level</td>
</tr>
<tr>
<td>alerts</td>
<td>Numerical severity 1. Indicates a condition where immediate action is required</td>
</tr>
<tr>
<td>critical</td>
<td>Numerical severity 2. Indicates a critical condition</td>
</tr>
<tr>
<td>debugging</td>
<td>Numerical severity 7. Debugging messages</td>
</tr>
<tr>
<td>emergencies</td>
<td>Numerical severity 0. System is unusable</td>
</tr>
<tr>
<td>errors</td>
<td>Numerical severity 3. Indicates an error condition</td>
</tr>
<tr>
<td>informational</td>
<td>Numerical severity 6. Indicates a informational condition</td>
</tr>
<tr>
<td>notification</td>
<td>Numerical severity 5. Indicates a normal but significant condition</td>
</tr>
<tr>
<td>warnings</td>
<td>Numerical severity 4. Indicates a warning condition. This is the default setting.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-rw-policy-test)#ip-mac conflict drop-only
rfs7000-37FABE(config-rw-policy-test)#ip-mac routing conflict log-and-drop log-level notifications
rfs7000-37FABE(config-fw-policy-test)#show context
firewall-policy test
  ip dos fraggle drop-only
  ip dos tcp-sequence-past-window drop-only
  ip dos tcp-max-incomplete high 600
  ip dos tcp-max-incomplete low 60
  ip-mac conflict drop-only
  ip-mac routing conflict log-only log-level notifications
  flow timeout icmp 16000
  flow timeout udp 10000
  flow timeout tcp established 1500
  flow timeout other 16000
  dhcp-offer-convert
  dns-snoop entry-timeout 35
rfs7000-37FABE(config-fw-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables actions based on device IP MAC table, IP address, and MAC address conflict detection</td>
</tr>
</tbody>
</table>
13.1.10 ipv6

`firewall-policy`

Configures IPv6 components on this firewall policy.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ipv6 [dos|duplicate-options|firewall|option|rewrite-flow-label|routing-type|
strict-ext-hdr-check|unknown-options]
```

```
ipv6 dos {hop-limit-zero/multicast-icmpv6/tcp-intercept-mobility}
   [drop-only|log-and-drop|log-only]
```

```
ipv6 [duplicate-options|routing-type [one|two]|strict-ext-hdr-check|
unknown-options] [drop-only|log-and-drop|log-only]
```

```
ipv6 option {endpoint-identification|network-service-access-point|router-alert|
strict-hao-opt-alert|strict-padding} [drop-only|log-and-drop|log-only]
```

```
ipv6 [firewall enable|rewrite-flow-label]
```

**Parameters**

- `ipv6 dos` `{hop-limit-zero/multicast-icmpv6/tcp-intercept-mobility}`
  `[drop-only|log-and-drop|log-only]`

<table>
<thead>
<tr>
<th>dos</th>
<th>Identifies IPv6 events as DoS events</th>
</tr>
</thead>
<tbody>
<tr>
<td>hop-limit-zero</td>
<td>Optional. Enables checking of IPv6 hop limit field. If the IPv6 hop limit field is ZERO (0) it is considered as attack. This option is enabled by default.</td>
</tr>
<tr>
<td>multicast-icmpv6</td>
<td>Optional. Enables detection of multicast ICMPv6 traffic as attack. This option is applicable only to ICMPv6 Echo request or reply packets. This option is enabled by default.</td>
</tr>
<tr>
<td>tcp-intercept-mobility</td>
<td>Optional. Enables detection of IPv6 TCP packets with mobility option &quot;HAO(Home-Address-Option)&quot; or &quot;RH(Routing Header) type two&quot;. When enabled, this option also detects the &quot;don't generate TCP syn cookies&quot; for such packets. This option is enabled by default.</td>
</tr>
<tr>
<td>drop-only</td>
<td>This parameter is common to all of the above keywords. Drops all packets. Drops the specified packet type (hop-limit-zero, multicast-icmpv6, and tcp-intercept-mobility).</td>
</tr>
<tr>
<td>log-and-drop</td>
<td>Logs the event and drops the packet. Drops the specified packet type (hop-limit-zero, multicast-icmpv6, and tcp-intercept-mobility) and logs an event.</td>
</tr>
<tr>
<td>log-only</td>
<td>Logs the event only, the packet is not dropped. Does not drop the specified packet type (hop-limit-zero, multicast-icmpv6, and tcp-intercept-mobility). But, an event is logged.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>ipv6</td>
<td>Enables handling of duplicate options in hop-by-hop and destination option extension headers. This configuration excludes HAO handling. This option is enabled by default.</td>
</tr>
</tbody>
</table>
| routing-type [one|two] | Enables checking of the following IPv6 routing types:  
| strict-ext-hdr-check | Enables strict checking for out of order and number of occurrences of extension header. This option is enabled by default. |
| unknown-options | Enables handling unknown options in hop-by-hop and destination option extension headers. This option is enabled by default. |
| drop-only | This parameter is common to all of the above keywords. Drops all packets. Drops the packet if matching any of the above specified types. |
| log-and-drop | Logs the event and drops the packet. Drops the packet, if matching any of the above specified types, and logs an event. |
| log-only | Logs the event only, the packet is not dropped. Does not drop the packet, if matching any of the above specified types. But an event is logged. |
| log-level | If selecting the "log-and-drop" and "log-only" action type, specify the log level. The options are:  
| <0-7> | Sets the numeric logging level  
| alerts | Numerical severity 1. Indicates a condition where immediate action is required  
| critical | Numerical severity 2. Indicates a critical condition  
| debugging | Numerical severity 7. Debugging messages  
| emergencies | Numerical severity 0. System is unusable  
| errors | Numerical severity 3. Indicates an error condition  
| informational | Numerical severity 6. Indicates a informational condition  
| notifications | Numerical severity 5. Indicates a normal but significant condition  
| warnings | Numerical severity 4. Indicates a warning condition. This is the default setting. |
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- **ipv6 option** `{endpoint-identification|network-service-access-point|router-alert|strict-hao-opt-alert|strict-padding} [drop-only|log-and-drop|log-only]`  

  **option** Enables checking for the following ipv6 extension header options:  
  - End point identification option (disabled by default)  
  - Network service access point address option (disabled by default)  
  - Router alert option (disabled by default)  
  - Home address option in destination option extension header (enabled by default)  
  - Pad1 and PadN options validating (enabled by default)  
  **Note:** All of these are optional parameters. If no option is specified, the system enables checks as per the default values.

- **drop-only**  
  This parameter is common to all of the above keywords. Drops all packets. Drops the packet if matching any of the above specified “option” types.

- **log-and-drop**  
  Logs the event and drops the packet. Drops the packet, if matching any of the above specified “option” types, and logs an event.

- **log-only**  
  Logs the event only, the packet is not dropped. Does not drop the packet, if matching any of the above specified “option” types. But an event is logged.

- **log-level**  
  If selecting the “log-and-drop” and “log-only” action type, specify the log level. The options are:  
  - `<0-7>` – Sets the numeric logging level  
  - alerts – Numerical severity 1. Indicates a condition where immediate action is required  
  - critical – Numerical severity 2. Indicates a critical condition  
  - debugging – Numerical severity 7. Debugging messages  
  - emergencies – Numerical severity 0. System is unusable  
  - errors – Numerical severity 3. Indicates an error condition  
  - informational – Numerical severity 6. Indicates a informational condition  
  - notifications – Numerical severity 5. Indicates a normal but significant condition  
  - warnings – Numerical severity 4. Indicates a warning condition. This is the default setting.

- **ipv6 [firewall enable|rewrite-flow-label]**

  | **firewall enable** | Enables IPv6 firewall. This option is enabled by default. |
  | **rewrite-flow-label** | Rewrites the IPv6 flow label field of every packet. This option is disabled by default. |

**Examples**

```
nx4500-5CFA2B(config-fw-policy-test)#ipv6 dos hop-limit-zero drop-only

nx4500-5CFA2B(config-fw-policy-test)#ipv6 routing-type two log-and-drop log-level warnings

nx4500-5CFA2B(config-fw-policy-test)#show context firewall-policy test
  no ip dos tcp-sequence-past-window
  ipv6 routing-type two log-and-drop log-level warnings
  ipv6 dos hop-limit-zero drop-only

nx4500-5CFA2B(config-fw-policy-test)#
```

**Related Commands**

- **no** Resets this firewall policy’s IPv6 components
## 13.1.11 ipv6-mac

*firewall-policy*

Defines an action based on conflicts detected in a device’s IPv6 and MAC addresses

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

ipv6-mac [conflict|routing]

ipv6-mac conflict [drop-only|log-and-drop|log-only]

ipv6-mac routing conflict [drop-only|log-and-drop|log-only]

**Parameters**

- ipv6-mac conflict [drop-only|log-and-drop|log-only]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>conflict</td>
<td>Enables detection of conflict between a device’s IPv6 and MAC addresses. This option is enabled by default. This command also specifies the action to be performed when a such a conflict is detected. The options are: drop-only, log-and-drop, and log-only</td>
</tr>
<tr>
<td>drop-only</td>
<td>Drops a packet (with conflicting IPv6 and MAC address) without logging</td>
</tr>
<tr>
<td>log-and-drop</td>
<td>Logs the event and drops the packet. This is the default setting.</td>
</tr>
<tr>
<td>log-only</td>
<td>Logs the event only, the packet is not dropped</td>
</tr>
<tr>
<td>log-level</td>
<td>If selecting the “log-and-drop” and “log-only” action type, specify the log level. The options are:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-7&gt; – Sets the numeric logging level</td>
</tr>
<tr>
<td></td>
<td>• alerts – Numerical severity 1. Indicates a condition where immediate action is required</td>
</tr>
<tr>
<td></td>
<td>• critical – Numerical severity 2. Indicates a critical condition</td>
</tr>
<tr>
<td></td>
<td>• debugging – Numerical severity 7. Debugging messages</td>
</tr>
<tr>
<td></td>
<td>• emergencies – Numerical severity 0. System is unusable</td>
</tr>
<tr>
<td></td>
<td>• errors – Numerical severity 3. Indicates an error condition</td>
</tr>
<tr>
<td></td>
<td>• informational – Numerical severity 6. Indicates a informational condition</td>
</tr>
<tr>
<td></td>
<td>• notifications – Numerical severity 5. Indicates a normal but significant condition</td>
</tr>
<tr>
<td></td>
<td>• warnings – Numerical severity 4. Indicates a warning condition. This is the default setting.</td>
</tr>
</tbody>
</table>

- ipv6-mac routing conflict [drop-only|log-and-drop|log-only]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>routing conflict</td>
<td>Enables detection of conflict between the next-hop’s IPv6 and MAC addresses. This option is enabled by default. This command also specifies the action to be performed when a such a conflict is detected. The options are: drop-only, log-and-drop, and log-only</td>
</tr>
<tr>
<td>drop-only</td>
<td>Drops a packet (with conflicting next-hop IPv6 and MAC addresses) without logging</td>
</tr>
<tr>
<td>log-and-drop</td>
<td>Logs the event and drops the packet. This is the default setting.</td>
</tr>
<tr>
<td>log-only</td>
<td>Logs the event only, the packet is not dropped</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------</td>
</tr>
</tbody>
</table>
| log-level     | If selecting the “log-and-drop” and “log-only” action type, specify the log level. The options are:  
|               | • <0-7> – Sets the numeric logging level  
|               | • alerts – Numerical severity 1. Indicates a condition where immediate action is required  
|               | • critical – Numerical severity 2. Indicates a critical condition  
|               | • debugging – Numerical severity 7. Debugging messages  
|               | • emergencies – Numerical severity 0. System is unusable  
|               | • errors – Numerical severity 3. Indicates an error condition  
|               | • informational – Numerical severity 6. Indicates an informational condition  
|               | • notifications – Numerical severity 5. Indicates a normal but significant condition  
|               | • warnings – Numerical severity 4. Indicates a warning condition. This is the default setting. |

**Examples**

nx4500-5CFA2B(config-fw-policy-test)#ipv6-mac routing conflict drop-only

nx4500-5CFA2B(config-fw-policy-test)#show context

firewall-policy test
  no ip dos tcp-sequence-past-window
  ipv6 routing-type two log-and-drop log-level warnings
  ipv6 dos hop-limit-zero drop-only
  ipv6-mac routing conflict drop-only

nx4500-5CFA2B(config-fw-policy-test)#

**Related Commands**

| no      | Disables actions based on device IPv6 MAC table, next-hop’s IPv6 and MAC address conflict detection |
13.1.12 logging

Configures enhanced firewall logging.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax:

```
logging [icmp-packet-drop|malformed-packet-drop|verbose]
logging verbose
logging [icmp-packet-drop|malformed-packet-drop] [all|rate-limited]

Parameters:
- logging verbose
- logging [icmp-packet-drop|malformed-packet-drop] [all|rate-limited]
```

Examples:

```
rfs7000-37PABE(config-rw-policy-test)#logging verbose
rfs7000-37PABE(config-rw-policy-test)#logging icmp-packet-drop rate-limited
rfs7000-37PABE(config-rw-policy-test)#logging malformed-packet-drop all
rfs7000-37PABE(config-fw-policy-test)#show context
firewall-policy test
ip dos fraggle drop-only
ip dos tcp-sequence-past-window drop-only
ip dos tcp-max-incomplete high 600
ip dos tcp-max-incomplete low 60
ip-mac conflict drop-only
ip-mac routing conflict log-only log-level notifications
flow timeout icmp 16000
flow timeout udp 10000
flow timeout tcp established 1500
flow timeout other 16000
dhcp-offer-convert
logging icmp-packet-drop rate-limited
logging malformed-packet-drop all
logging verbose
dns-snoop entry-timeout 35
rfs7000-37PABE(config-fw-policy-test)#
```
**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables enhanced firewall logging</td>
</tr>
</tbody>
</table>
13.1.13 no

Negates a command or sets the default for firewall policy commands

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [acl-logging|alg|clamp|dhcp-offer-convert|dns-snoop|firewall|flow|ip|ip-mac|i
ipv6|ipv6-mac|logging|proxy-arp|proxy-nd|stateful-packet-inspection-12|
storm-control|virtual-defragmentation]

no [acl-logging|dhcp-offer-convert|proxy-arp|proxy-nd|stateful-packet-inspection-12]

no alg [dns|facetime|ftp|pptp|scscp|sip|tftp]

no clamp tcp-mss

no dns-snoop entry-timeout

no firewall enable

no flow dhcp stateful

no flow timeout [icmp|other|udp]

no flow timeout tcp [closed-wait|established|reset|setup|stateless-fin-or-reset|
stateless-general]

no ip dos {ascend|broadcast-multicast-icmp|chargen|fraggle|ftp-bounce|
invalid-protocol|ip-ttl-zero|ipsproof|land|option-route|router-advt|router-solicit|
surf|snork|tcp-bad-sequence|tcp-fin-scan|tcp-intercept|tcp-null-scan|tcp-post-syn|
tcp-sequence-past-window|tcp-xmas-scan|tcphdrfrag|twinge|udp-short hdr|winnuke}

no ip tcp [adjust-mss|optimize-unnecessary-resends|recreate-flow-on-out-of-state-syn|
validate-icmp-unreachable|validate-rst-ack-number|validate-rst-seq-number]

no ip-mac conflict

no ip-mac routing conflict

no ipv6 [dos|duplicate-options|firewall|option|rewrite-flow-label|routing-type|
strict-ext-hdr-check|unknown-options]

no ipv6 dos {hop-limit-zero|multicast-icmpv6|tcp-intercept-mobility}

no ipv6 [duplicate-options|routing-type [one|two]|strict-ext-hdr-check|unknown-options]

no ipv6 option {endpoint-identification|network-service-access-point|router-alert|
strict-hao-opt-alert|strict-padding]

no ipv6 [firewall enable|rewrite-flow-label]

no logging [icmp-packet-drop|verbose|malformed-packet-drop]

no storm-control [arp|broadcast|multicast|unicast] {fe <1-4>|ge <1-8>|log|
port-channel <1-8>|up1|vlan <WLAN-NAME>}

no virtual-defragmentation {maximum-fragments-per-datagram|
minimum-first-fragment-length|maxi
mum-defragmentation-per-host|timeout}

Parameters

- no <PARAMETERS>

no <PARAMETERS> Negates a command or sets the default for firewall policy commands.
Examples

rfs7000-37FABE(config-fw-policy-test)# show context
firewall-policy test
  ip dos fraggle drop-only
    no ip dos tcp-sequence-past-window
    ip dos tcp-max-incomplete high 600
    ip dos tcp-max-incomplete low 60
    storm-control broadcast level 20000 ge 4
  storm-control arp log warnings
  ip-mac conflict drop-only
  ip-mac routing conflict log-and-drop log-level notifications
    flow timeout icmp 16000
    flow timeout udp 10000
    flow timeout tcp established 1500
    flow timeout other 16000
  dhcp-offer-convert
    logging icmp-packet-drop rate-limited
  logging malformed-packet-drop all
    logging verbose
    dns-snoop entry-timeout 35
rfs7000-37FABE(config-fw-policy-test)#

rfs7000-37FABE(config-fw-policy-test)# no ip dos fraggle
rfs7000-37FABE(config-fw-policy-test)# no storm-control arp log
rfs7000-37FABE(config-fw-policy-test)# no dhcp-offer-convert
rfs7000-37FABE(config-fw-policy-test)# no logging malformed-packet-drop

rfs7000-37FABE(config-fw-policy-test)# show context
firewall-policy test
  no ip dos fraggle
  no ip dos tcp-sequence-past-window
  ip dos tcp-max-incomplete high 600
  ip dos tcp-max-incomplete low 60
  storm-control broadcast level 20000 ge 4
  storm-control arp log none
  ip-mac conflict drop-only
  ip-mac routing conflict log-and-drop log-level notifications
    flow timeout icmp 16000
    flow timeout udp 10000
    flow timeout tcp established 1500
    flow timeout other 16000
    logging icmp-packet-drop rate-limited
    logging verbose
    dns-snoop entry-timeout 35
rfs7000-37FABE(config-fw-policy-test)#
13.1.14 **proxy-arp**

*firewall-policy*

Enables the generation of ARP responses on behalf of another device. Proxy ARP allows the Firewall to handle ARP routing requests for devices behind the firewall. This option is enabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`proxy-arp`

**Parameters**

None

**Examples**

```bash
rfs7000-37FABE(config-fw-policy-test)#proxy-arp
rfs7000-37FABE(config-fw-policy-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables the generation of ARP responses on behalf of another device</td>
</tr>
</tbody>
</table>
13.1.15 proxy-nd

*firewall-policy*

Enables generation of ND responses (for IPv6) on behalf of another device

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
proxy-nd
```

**Parameters**

None

**Examples**

```plaintext
nx9500-6C8809(config-fw-policy-fw1)#proxy-nd
nx9500-6C8809(config-fw-policy-fw1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>no</em></td>
<td>Disables the generation of ND responses on behalf of another device</td>
</tr>
</tbody>
</table>
13.1.16 `stateful-packet-inspection-l2`

`firewall-policy`

Enables layer 2 firewall stateful packet inspection. When enabled, allows stateful packet inspection for RF Domain manager routed interfaces within the layer 2 firewall. This option is enabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`stateful-packet-inspection-l2`

**Parameters**

None

**Examples**

```plaintext
rfs7000-37FABE(config-fw-policy-test)#stateful-packet-inspection-l2
rfs7000-37FABE(config-fw-policy-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables stateful packet inspection in a layer 2 firewall</td>
</tr>
</tbody>
</table>
13.1.17 storm-control

Enables storm control on the firewall policy.

Storms are packet bombardments that exceed the high threshold value configured for an interface. During a storm, packets are throttled until the rate falls below the configured rate, severely impacting performance for the RF Domain manager interface.

Storm control limits multicast, unicast and broadcast frames accepted and forwarded by a device. Messages are logged based on their severity level.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
storm-control [arp|broadcast|multicast|unicast]
storm-control [arp|broadcast|multicast|unicast] [level|log]
storm-control [arp|broadcast|multicast|unicast] level <1-1000000> [fe <1-4]|ge <1-8>|port-channel <1-8>|up1|wlan <WLAN-NAME>
storm-control [arp|broadcast|multicast|unicast] log [<0-7>|alerts|critical|debugging|emergencies|errors|informational|none|notifications|warnings]
```

Parameters

- storm-control [arp|broadcast|multicast|unicast] level <1-1000000> [fe <1-4]|ge <1-8]|port-channel <1-8>|up1|wlan <WLAN-NAME>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>arp</td>
<td>Configures storm control for ARP packets</td>
</tr>
<tr>
<td>broadcast</td>
<td>Configures storm control for broadcast packets</td>
</tr>
<tr>
<td>multicast</td>
<td>Configures storm control for multicast packets</td>
</tr>
<tr>
<td>unicast</td>
<td>Configures storm control for unicast packets</td>
</tr>
<tr>
<td>level &lt;1-1000000&gt;</td>
<td>Configures the allowed number of packets received per second</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-1000000&gt; – Sets the number of packets received per second</td>
</tr>
<tr>
<td>fe &lt;1-4&gt;</td>
<td>Sets the FastEthernet port for storm control from 1 - 4</td>
</tr>
<tr>
<td>ge &lt;1-8&gt;</td>
<td>Sets the GigabitEthernet port for storm control from 1 - 8</td>
</tr>
<tr>
<td>port-channel &lt;1-8&gt;</td>
<td>Sets the port channel for storm control from 1- 8</td>
</tr>
<tr>
<td>up1</td>
<td>Sets the uplink interface</td>
</tr>
<tr>
<td></td>
<td>• Note: For the NX45XX and NX65XX service platforms, the uplink interface range is 1 - 2.</td>
</tr>
<tr>
<td>wlan &lt;WLAN-NAME&gt;</td>
<td>Configures the WLAN</td>
</tr>
<tr>
<td></td>
<td>• &lt;WLAN-NAME&gt; – Sets the WLAN ID for the storm control configuration</td>
</tr>
</tbody>
</table>
storm-control [arp|bcast|multicast|unicast] log [<0-7>|alerts|critical|debugging|emergencies|errors|informational|none|notifications|warnings]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>arp</td>
<td>Configures storm control for ARP packets</td>
</tr>
<tr>
<td>broadcast</td>
<td>Configures storm control for broadcast packets</td>
</tr>
<tr>
<td>multicast</td>
<td>Configures storm control for multicast packets</td>
</tr>
<tr>
<td>unicast</td>
<td>Configures storm control for unicast packets</td>
</tr>
<tr>
<td>log</td>
<td>Configures the storm control log level for storm control events</td>
</tr>
<tr>
<td>&lt;0-7&gt;</td>
<td>Sets the numeric logging level from 0 - 7</td>
</tr>
<tr>
<td>alerts</td>
<td>Numerical severity 1. Indicates a condition where immediate action is required</td>
</tr>
<tr>
<td>critical</td>
<td>Numerical severity 2. Indicates a critical condition</td>
</tr>
<tr>
<td>debugging</td>
<td>Numerical severity 7. Debugging messages</td>
</tr>
<tr>
<td>emergencies</td>
<td>Numerical severity 0. System is unusable</td>
</tr>
<tr>
<td>errors</td>
<td>Numerical severity 3. Indicates an error condition</td>
</tr>
<tr>
<td>informational</td>
<td>Numerical severity 6. Indicates an informational condition</td>
</tr>
<tr>
<td>none</td>
<td>Disables storm control logging</td>
</tr>
<tr>
<td>notification</td>
<td>Numerical severity 5. Indicates a normal but significant condition</td>
</tr>
<tr>
<td>warnings</td>
<td>Numerical severity 4. Indicates a warning condition. This is the default setting.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-fw-policy-test)#storm-control arp log warning

rfs7000-37FABE(config-fw-policy-test)#storm-control broadcast level 20000 ge 4

rfs7000-37FABE(config-fw-policy-test)#show context
firewall-policy test
  ip dos fraggle drop-only
  no ip dos tcp-sequence-past-window
  ip dos tcp-max-incomplete high 600
  ip dos tcp-max-incomplete low 60
  storm-control broadcast level 20000 ge 4
  storm-control arp log warnings
  ip-mac conflict drop-only
  ip-mac routing conflict log-and-drop log-level notifications
  flow timeout icmp 16000
  flow timeout udp 10000
  flow timeout tcp established 1500
  flow timeout other 16000
dhcp-offer-convert
  logging icmp-packet-drop rate-limited
  logging malformed-packet-drop all
  logging verbose
dns-snoop entry-timeout 35
rfs7000-37FABE(config-fw-policy-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables storm control limits on multicast, unicast, and broadcast frames accepted and forwarded by a device</td>
</tr>
</tbody>
</table>
13.1.18 virtual-defragmentation

⚠ firewall-policy

Enables the virtual defragmentation of IPv4 and IPv6 packets. This parameter is required for optimal firewall functionality and is enabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
virtual-defragmentation {maximum-defragmentation-per-host <1-16384> |
  maximum-fragments-per-datagram <2-8129> | minimum-first-fragment-length <8-1500> |
  timeout <1-60>}
```

Parameters

- **virtual-defragmentation {maximum-defragmentation-per-host <1-16384> |
  maximum-fragments-per-datagram <2-8129> | minimum-first-fragment-length <8-1500> |
  timeout <1-60>}

| maximum-defragmentation-per-host <1-16384> | Optional. Configures the maximum number of active defragmentations allowed per host before it is dropped (applicable to IPv4 and IPv6 packets)
| maximum-fragments-per-datagram <2-8129> | Optional. Configures the maximum number of fragments allowed in a datagram before it is dropped (applicable to IPv4 and IPv6 packets)
| minimum-first-fragment-length <8-1500> | Optional. Defines the minimum length required for the first fragment (applicable to IPv4 and IPv6 packets)
| timeout <1-60> | Optional. Configures a virtual defragmentation timeout, in seconds, applicable to both IPv4 and IPv6 packets

| **maximum-defragmentation-per-host <1-16384>** | Optional. Configures the maximum number of active defragmentations allowed per host before it is dropped (applicable to IPv4 and IPv6 packets)
| • <1-16384> – Sets a value from 1 - 16384. The default is 8.
| **maximum-fragments-per-datagram <2-8129>** | Optional. Configures the maximum number of fragments allowed in a datagram before it is dropped (applicable to IPv4 and IPv6 packets)
| • <2-8129> – Sets a value from 2 - 8129. The default is 140.
| **minimum-first-fragment-length <8-1500>** | Optional. Defines the minimum length required for the first fragment (applicable to IPv4 and IPv6 packets)
| • <8-1500> – Sets a value from 8 - 1500 bytes. The default is 8 bytes.
| **timeout <1-60>** | Optional. Configures a virtual defragmentation timeout, in seconds, applicable to both IPv4 and IPv6 packets
| • <1-60> – Specify a value from 1 - 60 seconds. The default is 1 second.

Examples

```
rfs7000-37FABE(config-fw-policy-test)#virtual-defragmentation maximum-fragments-per-datagram 10
rfs7000-37FABE(config-fw-policy-test)#virtual-defragmentation minimum-first-fragment-length 100
```

Related Commands

```
no
```

Resets values or disables virtual defragmentation settings
This chapter summarizes MiNT policy commands in the CLI command structure. All communication using the MiNT transport layer can be optionally secured. This includes confidentiality, integrity and authentication of all communications. In addition, a device can be configured to communicate over MiNT with other devices authorized by an administrator.

Use the (config) instance to configure mint-policy related configuration commands. To navigate to the config MiNT policy instance, use the following command:

```
<DEVICE>(config)#mint-policy global-default
```

```
rfs7000-37FABE(config-mint-policy-global-default)#?
```

**Mint Policy Mode commands:**
- **level** Mint routing level
- **lsp** LSP
- **mtu** Configure the global Mint MTU
- **no** Negate a command or set its defaults
- **router** Mint router
- **udp** Configure mint UDP/IP encapsulation
- **clrscr** Clears the display screen
- **commit** Commit all changes made in this session
- **do** Run commands from Exec mode
- **end** End current mode and change to EXEC mode
- **exit** End current mode and down to previous mode
- **help** Description of the interactive help system
- **revert** Revert changes
- **service** Service Commands
- **show** Show running system information
- **write** Write running configuration to memory or terminal

```
rfs7000-37FABE(config-mint-policy-global-default)#
```

---

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (`_`) character. In other words, the name of a device cannot contain an underscore.
14.1 mint-policy

The following table summarizes MiNT policy configuration commands:

Table 14.1  MiNT-Policy-Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>level</td>
<td>Configures the MiNT routing level</td>
<td>page 14-3</td>
</tr>
<tr>
<td>lsp</td>
<td>Enables adding of checksum to LSP messages forwarded across MiNT links</td>
<td>page 14-4</td>
</tr>
<tr>
<td>mtu</td>
<td>Configures the global MiNT MTU</td>
<td>page 14-5</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 14-8</td>
</tr>
<tr>
<td>router</td>
<td>Configures the priority for MiNT router packets (HELLO, LSP, PSNP, and EXTVLAN)</td>
<td>page 14-6</td>
</tr>
<tr>
<td>udp</td>
<td>Configures the MiNT UDP/IP encapsulation parameters</td>
<td>page 14-7</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
14.1.1 level

 mint-policy

Configures the global MiNT routing level

Supported in the following platforms:

• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
level 2 area-id <1-16777215>

Parameters

• level 2 area-id <1-16777215>

<table>
<thead>
<tr>
<th>level 2</th>
<th>Configures level 2 inter-site MiNT routing</th>
</tr>
</thead>
<tbody>
<tr>
<td>area-id</td>
<td>Configures the routing area identifier</td>
</tr>
<tr>
<td>&lt;1-16777215&gt;</td>
<td>• &lt;1-16777215&gt; – Specify a value from 1 - 16777215.</td>
</tr>
</tbody>
</table>

The level 2 area ID is the global MiNT area identifier. This area identifier separates two overlapping MiNT networks. Configure the level 2 area ID only if there are two MiNT networks sharing the same packet broadcast domain.

Examples
rfs7000-37FABE(config-mint-policy-global-default)#level 2 area-id 2000
rfs7000-37FABE(config-mint-policy-global-default)#show context mint-policy global-default
level 2 area-id 2000
rfs7000-37FABE(config-mint-policy-global-default)#

Related Commands

| no | Disables level 2 MiNT packet routing (inter-site packet routing) |
14.1.2 lsp

 anunci-policy

Enables adding of checksum to label-switched path (LSP) messages forwarded across MiNT links. When enabled, this option helps to verify integrity of LSP messages. LSP messages exchanged over MiNT links are often corrupted. These LSP corruptions cause inaccuracies in the Shortest Path First (SPF) calculation process, leading to access point adoption related issues. Enabling LSP checksum helps troubleshooting adoption-related issues.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

lsp checksum

Parameters

- lsp checksum

| lsp checksum | Enables adding of checksum to LSP messages forwarded across MiNT links. When enabled, the integrity of LSP messages is verified by matching the LSP message checksum at the MiNT link end nodes. In case of a match the message is uncorrupted. |

Examples

nx4500-5CFA2B(config-mint-policy-global-default)#lsp checksum

nx4500-5CFA2B(config-mint-policy-global-default)#show context mint-policy global-default
lsp checksum
nx4500-5CFA2B(config-mint-policy-global-default)#

Related Commands

| no | Disables adding of checksum to LSP messages forwarded across MiNT links |
14.1.3 mtu

mint-policy

Configures global MiNT Multiple Transmission Unit (MTU). Use this command to specify the maximum packet size, in bytes, for MiNT routing. Higher the MTU values, greater is the network efficiency. The user data per packet increases, while protocol overheads, such as headers or underlying per-packet delays remain the same.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
mtu <900-1500>

Parameters
- mtu <900-1500>

Examples
rfs7000-37FABE(config-mint-policy-global-default)#mtu 1000
rfs7000-37FABE(config-mint-policy-global-default)#show context
mint-policy global-default
  mtu 996
  level 2 area-id 2
rfs7000-37FABE(config-mint-policy-global-default)#

Related Commands
no

Reverts the configured MiNT MTU value to its default (1500 bytes)
Negates the configured maximum packet size for MiNT routing
14.1.4 router

 Configures the priority for MiNT router packets (HELLO, LSP, PSNP, and EXT VLAN)

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
router packet priority <0-7>
```

Parameters

- `router packet priority <0-7>`

| router packet priority <0-7> | Allows you to configure the priority for MiNT router packets from 0 - 7. The default is 5. **Note:** Higher the value higher is the priority. Therefore, seven (7) represents highest priority. |

Examples

```
rfs4000-229D58(config-mint-policy-global-default)#router packet priority 4
```

```
rfs4000-229D58(config-mint-policy-global-default)#show context mint-policy global-default
router packet priority 4
rfs4000-229D58(config-mint-policy-global-default)#
```

Related Commands

- `no` Reverts the MiNT router packet priority to default (5)
14.1.5 udp

mint-policy

Configures MiNT UDP/IP encapsulation parameters. Use this command to configure the default UDP port used for MiNT control packet encapsulation.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

udp port <2-65534>

Parameters

- port <2-65534>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| port <2-65534> | Configures default UDP port used for MiNT control packet encapsulation
| <2-65534> | Enter a value from 2 - 65534. This value specifies an alternate UDP port used by MiNT control packets and must be an even number. The specified port number plus 1 is used to carry MiNT data packets. The default value is 24576.

Examples

rfs7000-37FABE(config-mint-policy-global-default)#udp port 1024
rfs7000-37FABE(config-mint-policy-global-default)#show context
mint-policy global-default
    udp port 1024
    mtu 996
    level 2 area-id 2000
    sign-unknown-device
    security-level control-and-data
    rejoin-timeout 1000
rfs7000-37FABE(config-mint-policy-global-default)#

Related Commands

no | Reverts MiNT UDP/IP encapsulation to its default
14.1.6 no

Negates a command or reverts values to their default. When used in the config MiNT policy mode, the no command resets or reverts the following global MiNT policy parameters: routing level, MTU, router packet priority, and UDP or IP encapsulation settings.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
no [level|lsp|mtu|router|udp]
nol level 2 area-id
no lsp checksum
no mtu
no router packet priority
no udp port <LINE-SINK>

Parameters
- no <PARAMETERS>

The no command resets or reverts the following global MiNT policy parameters: routing level, MTU, router packet priority, and UDP or IP encapsulation settings.

Examples
The following example shows the global Mint Policy parameters before the ‘no’ commands are executed:

rfs7000-37FABE(config-mint-policy-global-default)#show context
mint-policy global-default
  udp port 1024
  mtu 996
  level 2 area-id 2000
  sign-unknown-device
  security-level control-and-data
  rejoin-timeout 1000
rfs7000-37FABE(config-mint-policy-global-default)#

The following example shows the global Mint Policy parameters after the ‘no’ commands are executed:

rfs7000-37FABE(config-mint-policy-global-default)#show context
mint-policy global-default
  sign-unknown-device
  security-level control-and-data
  rejoin-timeout 1000
rfs7000-37FABE(config-mint-policy-global-default)#
This chapter summarizes management policy commands in the CLI command structure.

A management policy contains configuration elements for managing a device, such as access control, SNMP, admin user credentials, and roles.

A controller (wireless controller, access point, or service platform) uses mechanisms to allow or deny device access to separate interfaces and protocols (HTTP, HTTPS, FTP, Telnet, SSH or SNMP). Management access can be enabled or disabled as required for unique policies. The management access functionality is not meant to function as an ACL (in routers or other firewalls), where administrators specify and customize specific IPs to access specific interfaces.

Controllers and service platforms can be managed using multiple interfaces (SNMP, CLI and Web UI). By default, management access is unrestricted, allowing management access to any enabled IP interface from any host using any enabled management service.

To enhance security, administrators can do the following:

- Restrict SNMP, CLI and Web UI access to specific hosts or subnets
- Disable un-used and insecure interfaces as required within managed access profiles. Disabling un-used management services can dramatically reduce an attack footprint and free resources on managed devices
- Provide authentication for management users
- Apply access restrictions and permissions to management users

Management restrictions can be applied to meet specific policies or industry requirements requiring only certain devices or users be granted access to critical infrastructure devices. Management restrictions can also be applied to reduce the attack footprint of the device when guest services are deployed.

Access Points utilize a single management access policy, so ensure all the intended administrative roles, permissions, authentication and SNMP settings are correctly set. If an access point is functioning as a virtual controller AP, these are the access settings used by adopted access points of the same model as the virtual controller AP.

It is recommended to disable un-used and insecure interfaces as required within managed access profiles. Disabling un-used management services can dramatically reduce an attack footprint and free resources on managed devices.

Use the (config) instance to configure a management policy. To navigate to the config management policy instance, use the following commands:

```
<DEVICE>(config)#management-policy <POLICY-NAME>
```

To commit a management-policy, the policy must have at least one admin user account configured.
<DEVICE>(config-management-policy-<POLICY-NAME>)#user admin password 0 test role superuser access all
<DEVICE>(config-management-policy-<POLICY-NAME>)#

<DEVICE>(config-management-policy-<POLICY-NAME>)#?
Management Mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aaa-login</td>
<td>Set authentication for logins</td>
</tr>
<tr>
<td>allowed-locations</td>
<td>Add allowed locations</td>
</tr>
<tr>
<td>banner</td>
<td>Define a login banner</td>
</tr>
<tr>
<td>ftp</td>
<td>Enable FTP server</td>
</tr>
<tr>
<td>http</td>
<td>Hyper Text Terminal Protocol (HTTP)</td>
</tr>
<tr>
<td>https</td>
<td>Secure HTTP</td>
</tr>
<tr>
<td>idle-session-timeout</td>
<td>Configure idle timeout for a configuration session</td>
</tr>
<tr>
<td>ipv6</td>
<td>IPv6 Protocol</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>privilege-mode-password</td>
<td>Set the password for entering CLI privilege mode</td>
</tr>
<tr>
<td>rest-server</td>
<td>Enable rest server for device on-boarding</td>
</tr>
<tr>
<td>restrict-access</td>
<td>Restrict management access to the device</td>
</tr>
<tr>
<td>snmp-server</td>
<td>SNMP</td>
</tr>
<tr>
<td>ssh</td>
<td>Enable ssh</td>
</tr>
<tr>
<td>t5</td>
<td>T5 configuration</td>
</tr>
<tr>
<td>telnet</td>
<td>Enable telnet</td>
</tr>
<tr>
<td>user</td>
<td>Add a user account</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
</tr>
</tbody>
</table>

<DEVICE>(config-management-policy-<POLICY-NAME>)#

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
## 15.1 management-policy

The following table summarizes management policy configuration commands:

**Table 15.1 Management-Policy-Config Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>aaa-login</td>
<td>Configures login authentication settings</td>
<td>page 15-4</td>
</tr>
<tr>
<td>allowed-locations</td>
<td>Configures a user-role based access control to RF Domains and locations with respect to the NSight user interface (UI)</td>
<td>page 15-6</td>
</tr>
<tr>
<td>banner</td>
<td>Configures the message of the day (motd) text</td>
<td>page 15-7</td>
</tr>
<tr>
<td>ftp</td>
<td>Enables FTP on this management policy</td>
<td>page 15-8</td>
</tr>
<tr>
<td>http</td>
<td>Enables HTTP on this management policy</td>
<td>page 15-10</td>
</tr>
<tr>
<td>https</td>
<td>Enables HTTPS on this management policy</td>
<td>page 15-11</td>
</tr>
<tr>
<td>idle-session-timeout</td>
<td>Sets the interval after which an idle session is terminated</td>
<td>page 15-13</td>
</tr>
<tr>
<td>ipv6</td>
<td>Restricts management access to specified hosts and/or subnets based on their IPv6 addresses and prefixes respectively</td>
<td>page 15-14</td>
</tr>
<tr>
<td>no</td>
<td>Removes or resets this management policy’s settings</td>
<td>page 15-16</td>
</tr>
<tr>
<td>privilege-mode-password</td>
<td>Configures the CLI’s privilege mode access password</td>
<td>page 15-18</td>
</tr>
<tr>
<td>rest-server</td>
<td>Enables the Representational State Transfer (REST) server to facilitate device on-boarding</td>
<td>page 15-19</td>
</tr>
<tr>
<td>restrict-access</td>
<td>Restricts management access to a set of hosts or subnets</td>
<td>page 15-20</td>
</tr>
<tr>
<td>snmp-server</td>
<td>Sets the SNMP server settings on this management policy</td>
<td>page 15-22</td>
</tr>
<tr>
<td>ssh</td>
<td>Enables SSH on this management policy</td>
<td>page 15-26</td>
</tr>
<tr>
<td>t5</td>
<td>Configures SNMP server settings for T5 devices on this management policy. This command is available only RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000 platforms.</td>
<td>page 15-27</td>
</tr>
<tr>
<td>telnet</td>
<td>Enables Telnet on this management policy</td>
<td>page 15-29</td>
</tr>
<tr>
<td>user</td>
<td>Creates a new user account</td>
<td>page 15-30</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 15-34</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
### 15.1.1 aaa-login

#### management-policy

Configures Authentication, Authorization and Accounting (AAA) authentication mode used with this management policy. The different modes are: local authentication and external RADIUS server authentication.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
aaa-login [local|radius|tacacs]
```

```
aaa-login local
```

```
aaa-login radius [external|fallback|policy <AAA-POLICY-NAME>]
```

```
aaa-login tacacs [accounting|authentication|authorization|fallback|policy <AAA-TACACS-POLICY-NAME>]
```

#### Parameters

- **aaa-login local**
  
  Sets local as the preferred authentication mode. Local authentication uses the local username database to authenticate a user.  
  **Note:** The AP6511 and AP6521 platforms do not support local RADIUS resource.

- **aaa-login radius [external|fallback|policy <AAA-POLICY-NAME>]**
  
  Configures the RADIUS server parameters.  
  **Note:** If local authentication is disabled, use this command to specify if the RADIUS server used is external, fallback, or specified by a AAA policy.

- **aaa-login tacacs [accounting|authentication|authorization|fallback|policy <AAA-TACACS-POLICY-NAME>]**
  
  Configures TACACS accounting parameters.

- **aaa-login tacacs [accounting|authentication|authorization|fallback|policy <AAA-TACACS-POLICY-NAME>]**
  
  Configures Terminal Access Control Access-Control System (TACACS) server parameters.
Usage Guidelines
Use AAA login to determine whether management user authentication must be performed against a local user database or an external RADIUS server.

Examples
rfs7000-37FABE(config-management-policy-test)#aaa-login radius external
rfs7000-37FABE(config-management-policy-test)#aaa-login radius policy test
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
  http server
  no ssh
  aaa-login radius external
  aaa-login radius policy test
rfs7000-37FABE(config-management-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the TACACS server settings</td>
</tr>
</tbody>
</table>
15.1.2 allowed-locations

management-policy

Configures a user-role based access control to RF Domains and locations with respect to the NSight user interface (UI). When configured, this access control is enforced only on the NSight UI. Zebra’s WiNG and NSight applications may have the same users with different permissions defined in each application. Various user roles are supported in WiNG (superuser, system-admin, network-admin, security-admin, device-provisioning-admin, helpdesk and monitor). With NSight, a user logging into the NSight UI should also have an access control restriction based on the role they’re assigned. For example, a WiNG user with helpdesk privileges should have access to only the site (RF Domain) in which the helpdesk is situated, and the location tree should contain only one RF Domain. Similarly, when a user responsible for a set of sites logs in NSight, their location tree needs to contain the RF Domains for which they’re responsible.

NOTE: For more information on NSight-policy configuration, see nsight-policy.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
allowed-locations <WORD> locations [NONE|ALL|<LIST-OF-LOCATIONS>]

Parameters
- allowed-locations <WORD> locations [NONE|ALL|<LIST-OF-LOCATIONS>]

Examples
nx4500-5CFA8E(config-management-policy-test)#allowed-locations Ecospace locations TechPubs ALL

nx4500-5CFA8E(config-management-policy-test)#allowed-locations TEST locations NONE

nx4500-5CFA8E(config-management-policy-test)#show context management-policy test
  no telnet
  no http server
  https server
  ssh
  allowed-location TEST locations NONE
  allowed-location Ecospace locations TechPubs ALL

nx4500-5CFA8E(config-management-policy-test)#

Related Commands
no

Removes the allowed-locations configuration
15.1.3 banner

Configures the *message of the day* (motd) text. This text is displayed at login to clients connecting through Telnet or SSH.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
banner motd <LINE>
```

**Parameters**
- `banner motd <LINE>`

<table>
<thead>
<tr>
<th>motd &lt;LINE&gt;</th>
<th>Sets the motd banner</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;LINE&gt; – Enter the message string. The message string should not exceed 255 characters.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-management-policy-test)#banner motd "Have a Good Day"
rfs7000-37FABE(config-management-policy-test)#show context
  management-policy test
  http server
  no ssh
  aaa-login radius external
  aaa-login radius policy test
  banner motd "Have a Good Day"
rfs7000-37FABE(config-management-policy-test)#
```

**Related Commands**
- `no` — Removes the motd banner
15.1.4 ftp

management-policy

Enables File Transfer Protocol (FTP) on this management policy. FTP is the standard protocol for transferring files over a TCP/IP network. FTP requires administrators enter a valid username and password authenticated locally. FTP access is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX5524, NX6500, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```plaintext
ftp {password|rootdir|username}
ftp {password [1 <ENCRYPTED-PASSWORD>|<PASSWORD>]}  
ftp {rootdir <DIR>}
ftp {username <USERNAME> password [1 <ENCRYPTED-PASSWORD>|<PASSWORD>] rootdir <DIR>}
```

Parameters

- **ftp password**
  - Optional. Configures the FTP server password
  - 1 <ENCRYPTED-PASSWORD>
    - Configures an encrypted password. Use this option when copy pasting the password from another device.
    - `<ENCRIPTED-PASSWORD>` – Specify the password. The password should not exceed 63 characters in length.
  - `<PASSWORD>`
    - Configures a clear text password

- **ftp rootdir <DIR>**
  - Optional. Configures the root directory for FTP logins
  - `<DIR>` – Specify the root directory path. By default the root directory is set to flash:

- **ftp username <USERNAME>**
  - Optional. Configures a new user account on the FTP server. The FTP user file lists users with FTP server access.
    - `<USERNAME>` – Specify the username. The username should not exceed 32 characters in length.

- **password 1 [1 <ENCRYPTED-PASSWORD>|<PASSWORD>]**
  - Configures an encrypted password
    - `<ENCRIPTED-PASSWORD>` – Specifies an encrypted password (use this option if copy pasting from another device). The password should not exceed 63 characters in length.
    - `<PASSWORD>` – Configures a clear text password

- **rootdir <DIR>**
  - After specifying the password, configure the FTP root directory.
    - `rootdir <DIR>` – Configures the root directory for FTP logins. Specify the root directory path.
Usage Guidelines
The string size of an encrypted password (option 1, password is encrypted with a SHA1 algorithm) must be exactly 40 characters.

Examples
rfs7000-37FABE(config-management-policy-test)#ftp username superuser password test@123 rootdir dir
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
http server
  ftp username superuser password 1
  f617ca50c59fb47028f96db4baab5f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
  no ssh
  aaa-login radius external
  aaa-login radius policy test
  banner motd "Have a Good Day"
rfs7000-37FABE(config-management-policy-test)#

Related Commands

| no                  | Disables FTP and its settings, such as the server password, root directory, and users |
### 15.1.5 http

▶ **management-policy**

Enables *Hyper Text Transport Protocol* (HTTP) on this management policy

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
http server
```

#### Parameters

- `http server`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>http server</td>
<td>Enables HTTP on this management policy. HTTP provides limited authentication and no encryption.</td>
</tr>
</tbody>
</table>

#### Examples

```bash
rfs7000-37FABE(config-management-policy-test)#http server
```

```bash
rfs7000-37FABE(config-management-policy-test)#show context management-policy test
  http server
  ftp username superuser password 1
  f617ca50c59fb47028f96db4baab5f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
  no ssh
  aaa-login radius external
  aaa-login radius policy test
  banner motd "Have a Good Day"
```

#### Related Commands

- `no` Disables HTTP on this management policy
15.1.6 https

Enables Hyper Text Transport Protocol Secure (HTTPS) on this management policy

**NOTE:** If the a RADIUS server is not reachable, HTTPS management access to the controller or access point may be denied. RADIUS support is available locally on controllers and access points, with the exception of AP6511 and AP6522 models, which require an external RADIUS resource.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

https [server|sslv3|use-secure-ciphers-only]

**Parameters**

- https [server|sslv3|use-secure-ciphers-only]

<table>
<thead>
<tr>
<th>https</th>
<th>Configures secure HTTP related parameters on this management policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>server</td>
<td>Enables HTTPS on this management policy. HTTPS provides both authentication and data encryption as opposed to just authentication. This option is enabled by default.</td>
</tr>
<tr>
<td>sslv3</td>
<td>Enables the use of SSLv3 protocol to connect to a Web page. When enabled, SSLv2 Web authentication is disabled, and enforces the use of Web browsers supporting SSLv3, which is a more secure protocol. This option is disabled by default.</td>
</tr>
<tr>
<td>use-secure-ciphers-only</td>
<td>Enables the use of TLS v1.2 ciphers to secure client-server network communications. When enabled, for HTTPS connections the TLS v1.2 protocol is used, instead of the less secure TLS v1.0 or TLS v1.1 protocols. This option is enabled by default.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-management-policy-test)#https server

rfs7000-37FABE(config-management-policy-test)#show context management-policy test
http server
https server
ftp username superuser password 1
f617ca50c59fb47028f96db4baab8f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
no ssh
aaa-login radius external
aaa-login radius policy test
banner motd "Have a Good Day"
rfs7000-37FABE(config-management-policy-test)#

The following example shows that the ‘use-secure-ciphers-only’ option is enabled by default:

rfs6000-817379(config-management-policy-default)#show context include-factory incl https
https server
no https sslv3
https use-secure-ciphers-only
rfs6000-817379(config-management-policy-default)#
## Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables HTTPS on this management policy</td>
</tr>
</tbody>
</table>
15.1.7 idle-session-timeout

management-policy

Configures a session’s idle timeout. An idle session is automatically terminated after the specified interval is exceeded.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
idle-session-timeout <1-4320>

Parameters
- idle-session-timeout <1-4320>

Table: idle-session-timeout
| <1-4320> | Sets the interval, in minutes, after which an idle session is timed out. Specify a value from 1 - 4320 minutes. The default is 30 minutes. |

Examples
rfs7000-37FABE(config-management-policy-test)#idle-session-timeout 100
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
http server
https server
ftp username superuser password 1 f617ca50c59fb47028f96db4baab8f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
no ssh
aaa-login radius external
aaa-login radius policy test
idle-session-timeout 100
banner motd "Have a Good Day"
rfs7000-37FABE(config-management-policy-test)#

Related Commands
- no | Removes the configured idle session timeout value |
### 15.1.8 ipv6

- **management-policy**

Restricts management access to specified hosts and/or subnets based on their IPv6 addresses and prefixes respectively.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
ipv6 restrict-access [host|ipv6-access-list|subnet]

ipv6 restrict-access host <IPv6> {log|subnet}
ipv6 restrict-access host <IPv6> {log [all|denied-only]}
ipv6 restrict-access host <IPv6> {subnet <IPv6-PREFIX> {log [all|denied-only]}}

ipv6 restrict-access ipv6-access-list <IPv6-ACCESS-LIST-NAME>

ipv6 restrict-access subnet <IPv6-PREFIX> {host|log}
ipv6 restrict-access subnet <IPv6-PREFIX> {log [all|denied-only]}
ipv6 restrict-access subnet <IPv6-PREFIX> {host <IPv6> {log [all|denied-only]}}
```

**Parameters**

- **host <IPv6>**
  
  Restricts management access to a specified host, based on the host's IPv6 address.
  
  - `<IPv6>` – Specify the host's IPv6 address.

- **log [all|denied-only]**
  
  Optional. Configures a logging policy for access requests
  
  - all – Logs all access requests, both denied and permitted
  - denied-only – Logs only denied access events (when a host is denied access)

- **subnet <IPv6-PREFIX>**
  
  Optional. Restricts access to the host on a specified IPv6 subnet
  
  - `<IPv6-PREFIX>` – Specify the subnet's IPv6 prefix in the X:X::X:X/M format.

- **log [all|denied-only]**
  
  Optional. Configures a logging policy for access requests
  
  - all – Logs all access requests, both denied and permitted
  - denied-only – Logs only denied access events (when a host/subnet is denied access)
**ipv6 restrict-access ipv6-access-list <IPv6-ACCESS-LIST-NAME>**

- **ipv6-access-list <IPv6-ACCESS-LIST-NAME>**
  - Uses an IPv6 Access Control List (ACL) to filter access requests. IPv6 ACLs filter/mask packets based on the IPv6 address from which they arrive. IPv6 hosts configure themselves automatically when connected to an IPv6 network using the neighbor discovery (ND) protocol via ICMPv6 router discovery messages. These hosts require firewall packet protection unique to IPv6 traffic, as IPv6 addresses are composed of eight groups of four hexadecimal digits separated by colons. An existing IPv6 ACL can be created and used in the management policy context to permit or deny access to specific hosts and/or subnets.
  - `<IPv6-ACCESS-LIST-NAME>` – Specify the IPv6 ACL name.

**ipv6 restrict-access subnet <IPv6-PREFIX> {log [all|denied-only]}

- **subnet <IPv6-PREFIX>**
  - Restricts management access to a specified IPv6 subnet
  - `<IPv6-PREFIX>` – Specify the subnet's IPv6 prefix in the X:X::X:XM format.

- **log [all|denied-only]**
  - Optional. Configures a logging policy for access requests
  - `all` – Logs all access requests, both denied and permitted
  - `denied-only` – Logs only denied access events (when a host/subnet is denied access)

**ipv6 restrict-access subnet <IPv6-PREFIX> {host <IPv6> {log [all|denied-only]}}**

- **subnet <IPv6-PREFIX>**
  - Restricts management access to a specified IPv6 subnet
  - `<IPv6-PREFIX>` – Specify the subnet's IPv6 prefix in the X:X::X:XM format.

- **host <IPv6>**
  - Optional. Restricts management access to a specific host within the specified subnet
  - `<IPv6>` – Specify the host's IPv6 address.

- **log [all|denied-only]**
  - Optional. Configures a logging policy for access requests
  - `all` – Logs all access requests, both denied and permitted
  - `denied-only` – Logs only denied access events (when a host/subnet is denied access)

**Examples**

```
rfs7000-37FABE(config-management-policy-test)#ipv6 restrict-access host 2001:fdbc:06cf:0011::13 subnet 2001:fdbc:06cf:0011::0/64 log all
rfs7000-37FABE(config-management-policy-test)#show context management-policy test
http server
no ssh
ipv6 restrict-access host 2001:fdbc:06cf:0011::13 subnet 2001:fdbc:06cf:0011::0/64 log all
rfs7000-37FABE(config-management-policy-test)#
```

**Related Commands**

- **no**
  - Removes management access restriction settings
15.1.9 no

Negates a command or reverts values to their default. When used in the config management policy mode, the no command negates or reverts management policy settings.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no [aaa-login|allowed-locations|banner|ftp|http|https|idle-session-timeout|ipv6|
    privilege-mode-password|rest-server|restrict-access|snmp-server|ssh|t5|telnet|
    user|service]
```

no aaa-login tacacs [accounting|authentication|authorization|fallback|policy]

no allowed-location <LOCATION-TAG>

no banner motd

no ftp {password|rootdir}

no http server

no https [server|sslv3|use-secure-ciphers-only]

no [idle-session-timeout|privilege-mode-password|rest-server|restrict-access]

no ipv6 restrict-access

no snmp-server [community|display-vlan-info-per-radio|enable|host|manager|
    max-pending-requests|request-timeout|suppress-security-configuration-level|
    throttle|user]

no snmp-server [community <WORD>|display-vlan-info-per-radio|enable traps|
    host <IP> {<1-65535>}/manager [all|v1|v2|v3]|max-pending-requests|request-timeout|
    suppress-security-configuration-level|throttle|user [snmpmanager|snmpoperator|
    snmptrap]

no ssh {login-grace-time|port|use-key}

no t5 snmp-server [community|enable|host]

no [telnet|user <USERNAME>]

no service prompt crash-info

**Parameters**

- no <PARAMETERS>

| no <PARAMETERS> | Removes or reverts this Management policy settings based on the parameters passed |
Examples
The following example shows the management policy ‘test’ settings before the ‘no’ commands are executed:

```
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
    http server
    https server
    ftp username superuser password 1
    f617ca50c59fb47028f96db4baab5f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
    no ssh
    aaa-login radius external
    aaa-login radius policy test
    idle-session-timeout 100
    banner motd "Have a Good Day"
```

```
rfs7000-37FABE(config-management-policy-test)#no banner motd
rfs7000-37FABE(config-management-policy-test)#no idle-session-timeout
rfs7000-37FABE(config-management-policy-test)#no http server
```

The following example shows the management policy ‘test’ settings after the ‘no’ commands are executed:

```
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
    no http server
    https server
    ftp username superuser password 1
    f617ca50c59fb47028f96db4baab5f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
    no ssh
    aaa-login radius external
    aaa-login radius policy test
    idle-session-timeout 0
```

```
rfs7000-37FABE(config-management-policy-test)#
```
15.1.10 **privilege-mode-password**

*management-policy*

Configures the CLI’s privilege mode access password

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`privilege-mode-password [1 <PASSWORD>|<PASSWORD>]`

**Parameters**

- `privilege-mode-password [1 <PASSWORD>|<PASSWORD>]`

<table>
<thead>
<tr>
<th>1 &lt;PASSWORD&gt;</th>
<th>Configures an encrypted password. Use this option when copy pasting the password from another device.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;PASSWORD&gt;</td>
<td>Configures a clear text password</td>
</tr>
<tr>
<td>&lt;PASSWORD&gt; – Enter the password.</td>
<td>&lt;PASSWORD&gt; – Enter the password.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-management-policy-test)#privilege-mode-password testing@1234
```

```
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
  http server
  no ssh
  privilege-mode-password 1 2e9f038ac2ed27f919ed5a4dceeb3d30e32f356f2ceff6fbf26a153d0339c734f
rfs7000-37FABE(config-management-policy-test)#
```

**Related Commands**

- `no` | Removes the configured CLI privilege mode access password |
15.1.11 rest-server

Enables the Representational State Transfer (REST) server. When enabled, the REST server allows vendor users access to the online device registration portal. All requests and responses to and from the on-boarding portal are handled by the REST server through restful Application Programming Interface (API) transactions. The REST server serves the Web pages used to associate a device’s MAC address with a specific vendor group.

Each vendor has a ‘vendor-admin’ user who is assigned a unique, username/password credential for RADIUS server validation. Successfully validated vendor-admins can access the online device registration portal to on-board devices. For more information on vendor-admin user configuration, see user.

The REST server is enabled by default.

Supported in the following platforms:

- Service Platforms — NX9000, NX9500, NX9510, NX9600, VX9000

**Syntax**

```
rest-server
```

**Parameters**

None

**Examples**

```
nx9500-6C8809(config-management-policy-testMNGTPolicy)#show context
management-policy testMNGTPolicy
  no telnet
  no http server
  https server
  rest-server
  ssh

nx9500-6C8809(config-management-policy-testMNGTPolicy)#
```

```
nx9500-6C8809(config-management-policy-testMNGTPolicy)#no rest-server
```

```
nx9500-6C8809(config-management-policy-testMNGTPolicy)#show context
management-policy testMNGTPolicy
  no telnet
  no http server
  https server
  no rest-server
  ssh

nx9500-6C8809(config-management-policy-testMNGTPolicy)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the REST server</td>
</tr>
</tbody>
</table>
15.1.12 restrict-access

management-policy

Restricts management access to a set of hosts or subnets

Restricting remote access to a controller or service platform ensures only trusted hosts can communicate with enabled management services. This ensures only trusted hosts can perform management tasks and provide protection from brute force attacks from hosts attempting to break into the controller or service platform managed network.

Administrators can permit management connections to be established on any IP interface on the controller or service platform (including IP interfaces used to provide captive portal guest access). Administrators can restrict management access by limiting access to a specific host (IP address), subnet, or ACL on the controller or service platform.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

restrict-access [host|ip-access-list|subnet]

restrict-access host <IP> {log|subnet}
restrict-access host <IP> {log [all|denied-only]}
restrict-access host <IP> {subnet <IP/M> {log [all|denied-only]}}

restrict-access ip-access-list <IP-ACCESS-LIST-NAME>

restrict-access subnet <IP/M> {host|log}
restrict-access subnet <IP/M> {log [all|denied-only]}
restrict-access subnet <IP/M> {host <IP> {log [all|denied-only]}}

Parameters

- restrict-access host <IP> {log [all|denied-only]}

<table>
<thead>
<tr>
<th>host &lt;IP&gt;</th>
<th>Restricts management access to a specified host, based on the host’s IPv4 address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;IP&gt; – Specify the host’s IPv4 address.</td>
</tr>
</tbody>
</table>

| log [all|denied-only] | Optional. Configures a logging policy for access requests |
|----------------------|----------------------------------------------------------|
| all                  | • Logs all access requests, both denied and permitted     |
| denied-only          | • Logs only denied access (when an access request is received from a host denied access, a record is logged) |

- restrict-access host <IP> {subnet <IP/M> {log [all|denied-only]}}

<table>
<thead>
<tr>
<th>host &lt;IP&gt;</th>
<th>Restricts management access to a specified host, based on the host’s IPv4 address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;IP&gt; – Specify the host’s IPv4 address.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>subnet &lt;IP/M&gt;</th>
<th>Optional. Restricts access to the host on a specified subnet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;IP/M&gt; – Specify the subnet’s IPv4 address and mask in the A.B.C.D/M format.</td>
</tr>
</tbody>
</table>

| log [all|denied-only] | Optional. Configures a logging policy for access requests. |
|----------------------|----------------------------------------------------------|
| all                  | • Logs all access requests, both denied and permitted     |
| denied-only          | • Logs only denied access events (when access request received from a host is denied) |
### restrict-access ip-access-list <IP-ACCESS-LIST-NAME>

- **ip-access-list**: Uses an IPv4 ACL to filter access requests. IPv4 ACLs filter/mark packets based on the IPv4 address from which they arrive. IP and non-IP traffic, on the same layer 2 interface, can be filtered by applying an IPv4 ACL. Each IPv4 ACL contains a set of deny and/or permit rules. Each rule is specific to source and destination IPv4 addresses and the unique rules and precedence definitions assigned. When the network traffic matches the criteria specified in one of these rules, the action defined in that rule is used to determine whether the traffic is allowed or denied.

- **<IP-ACCESS-LIST-NAME>**: Specify the IPv4 ACL name.

### restrict-access subnet <IP/M> {log [all|denied-only]}

- **subnet <IP/M>**: Restricts management access to a specified subnet.
  - `<IP/M>` – Specify the subnet’s IPv4 address and mask in the A.B.C.D/M format.

- **log [all|denied-only]**: Optional. Configures a logging policy for access requests. Sets the log type generated for access requests.
  - **all** – Logs all access requests, both denied and permitted.
  - **denied-only** – Logs only denied access events (when access request received from a subnet is denied).

### restrict-access subnet <IP/M> {host <IP> {log [all|denied-only]}}

- **subnet <IP/M>**: Restricts management access to a specified subnet.
  - `<IP/M>` – Specify the subnet’s IPv4 address and mask in the A.B.C.D/M format.

- **host <IP>**: Optional. Uses the host IP address as a second filter.
  - `<IP>` – Specify the host’s IPv4 address.

- **log [all|denied-only]**: Optional. Configures a logging policy for access requests. Sets the log type generated for access requests.
  - **all** – Logs all access requests, both denied and permitted.
  - **denied-only** – Logs only denied access events (when access request received from a host within the specified subnet is denied).

### Examples

```
rfs7000-37FABE(config-management-policy-test)#restrict-access host 172.16.10.4 log denied-only
```

```
rfs7000-37FABE(config-management-policy-test)#show context
    management-policy test
        no http server
        https server
        ftp username superuser password 1
        f617ca50c59fb47028f96db4baab5f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
        no ssh
        aaa-login radius external
        aaa-login radius policy test
        idle-session-timeout 0
    restrict-access host 172.16.10.4 log denied-only
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes device access restrictions</td>
</tr>
</tbody>
</table>
15.1.13 snmp-server

Enables the Simple Network Management Protocol (SNMP) engine settings. SNMP is an application layer protocol that facilitates the exchange of management information between the controller and a managed device. SNMP enabled devices listen on port 162 (by default) for SNMP packets from the controller’s management server. SNMP uses read-only and read-write community strings as an authentication mechanism to monitor and configure supported devices. The read-only community string gathers statistics and configuration parameters from a supported wireless device. The read-write community string is used by a management server to set device parameters. SNMP is generally used to monitor a system’s performance and other parameters.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
snmp-server [community|enable|display-vlan-info-per-radio|host|manager|
max-pending-requests|request-timeout|suppress-security-configuration-level|
throttle|user]

snmp-server community [0 <WORD>|2 <WORD>|<WORD>] [ro|rw]
{ip-snmp-access-list <IP-SNMP-ACL-NAME>}

snmp-server enable traps

snmp-server host <IP> [v1|v2c|v3] {<1-65535>}

snmp-server manager [all|v1|v2|v3]

snmp-server [max-pending-requests {<64-1024>}]|request-timeout {<2-720>}

snmp-server [display-vlan-info-per-radio|throttle <1-100>]
|supress-security-configuration-level [0|1]]

snmp-server user [snmpmanager|snmpoperator|snmptrap]

snmp-server user [snmpmanager|snmpoperator|snmptrap] v3 [auth|encrypted]

snmp-server user [snmpmanager|snmpoperator|snmptrap] v3 auth md5
[0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]

snmp-server user [snmpmanager|snmpoperator|snmptrap] v3 encrypted
[auth md5|des auth md5] [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]
```

Parameters

- **snmp-server community [0 <WORD>|2 <WORD>|<WORD>] [ro|rw] [ip-snmp-access-list <IP-SNMP-ACL-NAME>]**

<p>| community [0 &lt;WORD&gt;| 2 &lt;WORD&gt;| &lt;WORD&gt;] | Sets the community string and associated access privileges. Enables SNMP access by configuring community strings that act like passwords. Configure different types of community strings, each string providing a different form of access. Provide either read-only (ro) or read-write (rw) access. |
|-----------------------------------------|-------------------------------------------------|
| 0 &lt;WORD&gt; – Sets a clear text SNMP community string |
| 2 &lt;WORD&gt; – Sets an encrypted SNMP community string |
| &lt;WORD&gt; – Sets the SNMP community string |</p>
<table>
<thead>
<tr>
<th><strong>SNMP Configuration</strong></th>
<th>Description</th>
</tr>
</thead>
</table>
| **[ro|rw]**            | After configuring the SNMP community string, assign one of the following accesses:  
  • **ro** — Assigns read-only access to the specified SNMP community (allows a remote device to retrieve information)  
  • **rw** — Assigns read and write access to the specified SNMP community (allows a remote device to modify settings) |
| **ip-snmp-access-list** | Optional. Associates an IP SNMP access list (should be existing and configured). The IP SNMP ACL sets the SNMP management station’s IP address. SNMP trap information is received at this address. |
| **ip-snmp-access-list** | Optional. Associates an IP SNMP access list (should be existing and configured). The IP SNMP ACL sets the SNMP management station’s IP address. SNMP trap information is received at this address. |

- **snmp-server enable traps**

- **enable traps**

| **enable traps** | Enables trap generation (using the trap receiver configuration defined). This feature is disabled by default. Enabling this feature ensures the dispatch of SNMP notifications to all hosts.  
In a managed network, the controller uses SNMP trap receivers to notify faults. SNMP traps are unsolicited notifications triggered by thresholds (or actions) on devices and are therefore an important fault management tool.  
A SNMP trap receiver is the destination of SNMP messages (external to the controller). A trap is like a Syslog message, just over another protocol (SNMP). A trap is generated when a device consolidates event information and transmits the information to an external repository. The trap contains several standard items, such as the SNMP version, community, etc.  
SNMP trap notifications exist for most controller operations, but not all are necessary for day-to-day operation. |

- **snmp-server host <IP> [v1|v2c|v3] {<1-65535>**

| **host <IP>** | Configures a host’s IP address. This is the external server resource dedicated to receiving SNMP traps on behalf of the controller. |
| **[v1|v2c|v3]** | Configures the SNMP version used to send the traps  
  • **v1** — Uses SNMP version 1. This option is disabled by default.  
  • **v2c** — Uses SNMP version 2c. This option is disabled by default.  
  • **v3** — Uses SNMP version 3. This option is enabled by default. |
| **<1-65535>** | Optional. Configures the virtual port of the server resource dedicated to receiving SNMP traps  
  • **<1-65535>** — Optional. Specify a value from 1 - 65535. The default port is 162. |

- **snmp-server manager [all|v1|v2|v3]**

| **manager [all|v1|v2|v3]** | Enables SNMP manager and specifies the SNMP version  
  • **all** — Enables SNMP manager version v2 and v3  
  • **v1** — Enables SNMP manager version v1 only. SNMPv1 uses a simple password ("community string"). Data is unencrypted (clear text). Consequently it provides limited security, and should be used only inside LANs behind firewalls, not in WANs.  
  • **v2** — Enables SNMP manager version v2 only. SNMPv2 provides device management using a hierarchical set of variables. SNMPv2 uses Get, GetNext, and Set operations for data management. SNMPv2 is enabled by default. |

Contd..
### snmp-server [max-pending-requests `{<64-1024>}`|request-timeout `{<2-720>}`]

- **max-pending-requests `{<64-1024>}`**
  - Sets the maximum number of requests that can be pending at any given time
  - `<64-1024>` – Optional. Specify a value from 64 - 1024. The default is 128.

- **request-timeout `{<2-720>}`**
  - Sets the interval, in seconds, after which an error message is returned for a pending request
  - `<2-720>` – Optional. Specify a value from 2 - 720 seconds. The default is 240 seconds.

### snmp-server [display-vlan-info-per-radio|throttle `<1-100>`|suppress-security-configuration-level `[0|1]`]

- **display-vlan-info-per-radio**
  - Enables the display of the VLAN ID along with the radio interface ID

- **throttle `<1-100>`**
  - Sets CPU usage for SNMP activities. Use this command to set the CPU usage from 1 - 100.

- **suppress-security-configuration-level `[0|1]`**
  - Sets the level of suppression of SNMP security configuration information
  - `<0>` – If this option is selected, an empty string is returned for the SNMP request for security configuration information. Security configuration information consists of:
    - Passwords
    - Keys
    - Shared secrets
  - `<1>` – Suppresses the display of the policy, IP ACL, passwords, keys and shared secrets. If this option is selected, in addition to suppression from ‘Level 0’, an empty string is returned for a SNMP request on following items:
    - Management policies
    - IP ACL
    - Tables containing user names and community strings

### snmp-server user `[snmpmanager|snmpoperator|snmptrap]` v3 auth md5 `[0 `<PASSWORD>`|2 `<ENCRYPTED-PASSWORD>`|<PASSWORD>]

- **user `[snmpmanager|snmpoperator|snmptrap]`**
  - Defines user access to the SNMP engine
  - `snmpmanager` – Sets user as a SNMP manager
  - `snmpoperator` – Sets user as a SNMP operator
  - `snmptrap` – Sets user as a SNMP trap user

- **v3 auth md5**
  - Uses SNMP version 3 as the security model
  - `<auth>` – Uses an authentication protocol
  - `<md5>` – Uses HMAC-MD5 algorithm for authentication

- **[0 `<PASSWORD>`|2 `<ENCRYPTED-PASSWORD>`|<PASSWORD>]**
  - Configures password using one of the following options:
    - `<0>` `<PASSWORD>` – Configures clear text password
    - `<2>` `<ENCRYPTED-PASSWORD>` – Configures encrypted password
    - `<PASSWORD>` – Specifies a password for authentication and privacy protocols
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- `snmp-server user [snmpmanager|snmpoperator|snmptrap] v3 encrypted [auth md5|des auth md5] [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]`

| user [snmpmanager|snmpoperator|snmptrap] | Defines user access to the SNMP engine |
|------------------------------------------|---------------------------------------|
|                                          | • snmpmanager – Sets user as a SNMP manager |
|                                          | • snmpoperator – Sets user as a SNMP operator |
|                                          | • snmptrap – Sets user as a SNMP trap user |

<table>
<thead>
<tr>
<th>v3 encrypted</th>
<th>Uses SNMP version 3 as the security model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• encrypted – Uses encrypted privacy protocol</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>auth md5</th>
<th>Uses authentication protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• auth – Sets authentication parameters</td>
</tr>
<tr>
<td></td>
<td>• md5 – Uses HMAC-MD5 algorithm for authentication</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>des auth md5</th>
<th>Uses privacy protocol for user privacy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• des – Uses CBC-DES for privacy</td>
</tr>
<tr>
<td></td>
<td>After specifying the privacy protocol, specify the authentication mode.</td>
</tr>
<tr>
<td></td>
<td>• auth – Sets user authentication parameters</td>
</tr>
<tr>
<td></td>
<td>• md5 – Uses HMAC-MD5 algorithm for authentication</td>
</tr>
</tbody>
</table>

| [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>] | The following are common to both the auth and des parameters: |
|------------------------------------------------|---------------------------------------------------------------|
|                                               | Configures password using one of the following options: |
|                                               | • 0 <PASSWORD> – Configures a clear text password |
|                                               | • 2 <ENCRYPTED-PASSWORD> – Configures an encrypted password |
|                                               | • <PASSWORD> – Specifies a password for authentication and privacy protocols |

**Examples**

```
rfs7000-37FABE(config-management-policy-test)#snmp-server community snmpl ro
rfs7000-37FABE(config-management-policy-test)#snmp-server host 172.16.10.23 v3 162
rfs7000-37FABE(config-management-policy-test)#commit
rfs7000-37FABE(config-management-policy-test)#snmp-server user snmpmanager v3 auth md5 test@123
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
no http server
https server
ftp username superuser password 1
f617ca50c59fb47028f96db4baab5f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
no ssh
snmp-server community snmpl ro
snmp-server user snmpmanager v3 encrypted des auth md5 0 test@123
snmp-server host 172.16.10.23 v3 162
aaa-login radius external
aaa-login radius policy test
idle-session-timeout 0
restrict-access host 172.16.10.2 log all
```

**Related Commands**

- `no` Disables or resets the SNMP server settings
15.1.14 ssh

management-policy

Enables Secure Shell (SSH) for this management policy

SSH, like Telnet, provides a command line interface to a remote host. SSH transmissions are encrypted and authenticated, increasing the security of transmission. SSH access is disabled by default.

**NOTE:** If the a RADIUS server is not reachable, SSH management access to the controller or access point may be denied. RADIUS support is available locally on controllers and access points, with the exception of AP6511 and AP6522 models, which require an external RADIUS resource.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP84XX, AP8532, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ssh {login-grace-time <60-300>|port <1-65535>}
```

**Parameters**

- `ssh {login-grace-time <60-300>|port <1-65535>}`

<table>
<thead>
<tr>
<th>ssh</th>
<th>Enables SSH communication between client and server</th>
</tr>
</thead>
<tbody>
<tr>
<td>login-grace-time &lt;60-300&gt;</td>
<td>Optional. Configures the login grace time. This is the interval, in seconds, after which an unsuccessful login is disconnected.</td>
</tr>
<tr>
<td>port &lt;1-65535&gt;</td>
<td>Optional. Configures the SSH port. This is the port used for SSH connections.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-management-policy-test)#ssh port 162
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
no http server
https server
ftp username superuser password 1
f617ca50c59fba47028f96db4baab5f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
ssh port 162
snmp-server community snmp1 ro
snmp-server user snmpmanager v3 encrypted des auth md5 0 test@123
snmp-server host 172.16.10.23 v3 162
aaa-login radius external
aaa-login radius policy test
idle-session-timeout 0
restrict-access host 172.16.10.2 log all
rfs7000-37FABE(config-management-policy-test)#
```

**Related Commands**

| no | Resets SSH access port to factory default (port 22) |
15.1.15 t5

management-policy

Configures SNMP server settings for T5 devices on this management policy.

A T5 controller is an external device that can be adopted and managed by a WiNG controller. When enabled as a supported external device, a T5 controller can provide data to WiNG to assist in it's management within a WiNG supported subnet.

This command enables SNMP to communicate with T5 devices within the network. SNMP facilitates the exchange of management information between the controller or service platform and the T5 device. For more information, see snmp-server.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

t5 snmp-server [community|contact|enable|host|location]

t5 snmp-server community <COMMUNITY-NAME> [ro|rw] <SNMP-STATION-IP>

t5 snmp-server contact <LINE>

t5 snmp-server enable [server|traps]

t5 snmp-server host <IP>

t5 snmp-server location <LINE>

Parameters
- t5 snmp-server community <COMMUNITY-NAME> [ro|rw] <SNMP-STATION-IP>

  community <COMMUNITY-NAME> [ro|rw]

  Defines a public or private community designation. By default, SNMPv2 community strings on most devices are set to public, for the read-only community string, and private for the read-write community string.
  - <COMMUNITY-NAME> – Specify the SNMP community name, and configure the access permission for this community string (used by devices to retrieve or modify information).
  - ro – Allows a remote device to retrieve information only
  - rw – Allows a remote device to retrieve information and modify settings

  <SNMP-STATION-IP>

  Specify the SNMP management station IP address for receiving trap information

- t5 snmp-server contact <LINE>

  contact <LINE>

  Configures the administrator of SNMP trap events for the T5 controller.
  - <LINE> – Specify the administrator’s name (should not exceed 64 characters).

- t5 snmp-server enable [server|traps]

  enable [server|traps]

  Enables the following:
  - server – Enables the SNMP server. When enabled, the system accepts SNMP management data. This is enabled by default.
  - traps – Enables SNMP traps. When enabled, the system generates SNMP traps. This is enabled by default.
- `t5 snmp-server host <IP>`

  | host <IP> | Configures the T5 SNMP host's IP address. The SNMP host receives the SNMP notifications.  
  | --- | ---  
  | • <IP> – Specify the SNMP host's IP address.  

- `t5 snmp-server location <LINE>`

  | location <LINE> | Configures the system location for SNMP traps.  
  | --- | ---  
  | • <LINE> – Specify the SNMP trap location (should not exceed 64 characters).  

**Examples**

```
nx9500-6C8809(config-management-policy-test)#t5 snmp-server community lab rw 192.168.13.7

nx9500-6C8809(config-management-policy-test)#show context
    management-policy test
        http server
        no ssh
        t5 snmp-server community lab rw 192.168.13.7

nx9500-6C8809(config-management-policy-test)#
```

**Related Commands**

| no | Removes or reverts SNMP server configuration for T5 devices |
15.1.16 *telnet*

*management-policy*

Enables Telnet. Telnet provides a command line interface to a remote host over TCP. Telnet provides no encryption, but it does provide a measure of authentication. Telnet access is disabled by default.

By default Telnet, when enabled, uses *Transmission Control Protocol* (TCP) port 23. Use this command to change the TCP port.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

telnet {port <1-65535>}

**Parameters**
- telnet {port <1-65535>}

<table>
<thead>
<tr>
<th>telnet</th>
<th>Enables Telnet</th>
</tr>
</thead>
<tbody>
<tr>
<td>port &lt;1-65535&gt;</td>
<td>Optional. Configures the Telnet port. This is the port used for Telnet connections.</td>
</tr>
<tr>
<td></td>
<td>- &lt;1-65535&gt; – Sets a value from 1 - 65535. The default port is 23.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-management-policy-test)#telnet port 200

rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
telnet port 200
no http server
https server
ftp username superuser password 1
f617ca50c59fb47028f96db4baab5f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
ssh port 162
snmp-server community snmp1 ro
snmp-server user snmpmanager v3 encrypted des auth md5 0 test@123
snmp-server host 172.16.10.23 v3 162
aaa-login radius external
aaa-login radius policy test
idle-session-timeout 0
restrict-access host 172.16.10.2 log all
rfs7000-37FABE(config-management-policy-test)#
```

**Related Commands**

| **no** | Disables Telnet |
user

management-policy

 Adds new user account. Use this option to add a new user, and define the role, access type, and allowed locations assigned to the user.

Management services like Telnet, SSHv2, HTTP, HTTPS and FTP require users (administrators) enter a valid username and password, which is authenticated locally or centrally on a RADIUS server. SNMPv3 also requires a valid username and password, which is authenticated by the SNMPv3 module. For CLI users, the controller or service platform also requires user role information to know what permissions to assign.

- If local authentication is used, associated role information is defined on the controller or service platform when the user account is created.
- If RADIUS is used, role information is supplied by RADIUS using vendor-specific return attributes. If no role information is supplied by RADIUS, the controller or service platform applies default read-only permissions.

Administrators can limit users to specific management interfaces. During authentication, the controller or service platform looks at the user’s access assignment to determine if the user has permissions to access an interface:

- If local authentication is used, role information is defined on the controller or service platform when the user account is created.
- If RADIUS is used, role information is supplied by RADIUS using vendor-specific return attributes.

The controller or service platform authenticates users using the integrated local database. When user credentials are presented the controller or service platform validates the username and password against the local database and assigns permissions based on the associated roles assigned. The controller or service platform can also deny the authentication request if the user is attempting to access a management interface not specified in the account’s access mode list.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP812X, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

user <USERNAME> password [0 <PASSWORD>|1 <SHA1-PASSWORD>|<PASSWORD>]
role [device-provisioning-admin|helpdesk|monitor|network-admin|security-admin|superuser|system-admin|vendor-admin|web-user-admin]

user <USERNAME> password [0 <PASSWORD>|1 <SHA1-PASSWORD>|<PASSWORD>]
role [device-provisioning-admin|helpdesk|monitor|network-admin|security-admin|superuser|system-admin|vendor-admin|web-user-admin] access [all|console|ssh|telnet|web]
(allowed-locations <ALLOWED-LOCATIONS>)

user <USERNAME> password [0 <PASSWORD>|1 <SHA1-PASSWORD>|<PASSWORD>]
role vendor-admin
group <VENDOR-GROUP-NAME>

Parameters

- user <USERNAME> password [0 <PASSWORD>|1 <SHA1-PASSWORD>|<PASSWORD>]
role [device-provisioning-admin|helpdesk|monitor|network-admin|security-admin|superuser|system-admin|web-user-admin] access [all|console|ssh|telnet|web]
(allowed-locations <ALLOWED-LOCATIONS>)}

user <USERNAME> Adds a new user account to this management policy

- <USERNAME> – Sets the username. This is a mandatory field and cannot exceed 32 characters. Assign a name representative of the user and the intended role.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>password [0 &lt;PASSWORD&gt;</td>
<td>1 &lt;SHA1-PASSWORD&gt;</td>
</tr>
<tr>
<td>role</td>
<td>Configures the user role. The options are:</td>
</tr>
<tr>
<td>access [all</td>
<td>console</td>
</tr>
<tr>
<td>allowed-locations &lt;ALLOWED-LOCATIONS&gt;</td>
<td>Optional. This keyword is recursive and optional. It configures a list of locations (either as a path or a RF Domain) to which this user is allowed access.</td>
</tr>
</tbody>
</table>

**Examples:**
- `user <USERNAME> password [0 <PASSWORD>| 1 <SHA1-PASSWORD>|<PASSWORD>] role vendor-admin`  
- `group <VENDOR-GROUP-ADMIN>`  
- `allowed-locations`  

**Notes:**
- Use this option to configure a list of RF Domains or its tree nodes to which this user is allowed access with respect to the Nsight policy.  
- This option is not applicable to the user role ‘web-user-admin’.
### role vendor-admin

Configures this user's role as vendor-admin. Once created, the vendor-admin can access the online device-registration portal to add devices to the RADIUS vendor group to which he/she belongs. Vendor-admins have only Web access to the device registration portal.

The WiNG software allows multiple vendors to securely on-board their devices through a single SSID. Each vendor has a 'vendor-admin' user who is assigned a unique, username/password credential for RADIUS server validation. Successfully validated vendor-admins can on-board their devices, which are, on completion of the on-boarding process, immediately placed on the vendor-allowed VLAN. On subsequent associations with this SSID, registered devices are dynamically placed into the vendor-allowed VLAN.

If assigning the vendor-admin role, provide the vendor's group name for RADIUS authentication. The vendor's group takes precedence over the statically configured group for device registration.

**Note:** Use the `service > show > wireless > credential-cache` command to view on-boarded device's VLAN assignment.

**Note:** Ensure that the REST server is enabled, to allow vendor users access to the online device registration portal. Note, by default the REST server is enabled. For more information, see `rest-server`.

### group <VENDOR-GROUP>

 Associates this vendor-admin user with a vendor group, required for RADIUS authentication. The vendor group should be existing and configured in the RADIUS group policy. For more information on configuring RADIUS groups, see `radius-group`.

- `<VENDOR-GROUP>` – Provide the vendor group name. In case of multiple allowed groups, provide a list of comma-separated group names.

### Examples

```bash
rfs7000-37FABE(config-management-policy-test)#user TESTER password test123 role superuser access all
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
telnet port 200
no http server
https server
ftp username superuser password 1
f617ca50c59fb47028f96db4baab5f3d8f03c03ab257960b0fd127c69f02cd7e rootdir dir
ssh port 162
user TESTER password 1 b6b37c51405f4e93c67fe8af82d450c9fd6af69324cd56a55055cefe695b6a14
cfg-group vendor-admin
role superuser access all
snmp-server community snmp1 ro
snmp-server user snmpmanager v3 encrypted des auth md5 0 test@123
snmp-server host 172.16.10.23 v3 162
aaa-login radius external
aaa-login radius policy test
idle-session-timeout 0
restrict-access host 172.16.10.2 log all
rfs7000-37FABE(config-management-policy-test)#
```
nx9500-6C8809(config-management-policy-OB)#user test password 0 test123 role vendor-admin group Apple,Sony,Samsung

nx9500-6C8809(config-management-policy-OB)#user Samsung password 0 samsung role vendor-admin group Samsung

nx9500-6C8809(config-management-policy-OB)#show context
management-policy OB
no telnet
no http server
https server
rest-server
ssh
user admin password 1 d9849649218dca479109fbd47b102a24ecdf1edd220d21f76ce4c15a4e7e696 role superuser access all
user test password 1 62fca173a1ff0e9cc4eef782b1978a50e047f66bc57a32992f03e00fe0bc4 role vendor-admin group Apple,Sony,Samsung
user Samsung password 1 39cb036b8e090c2ec625ebcda6e4001f4584263ed86fa69fc1f6b284113772eb0 role vendor-admin group Samsung

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a user account</td>
</tr>
</tbody>
</table>
15.1.18 service

Invokes service commands

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
service [prompt|show]
service [prompt crash-info|show cli]
```

Parameters

- service [prompt crash-info|show cli]

<table>
<thead>
<tr>
<th>command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>service prompt</td>
<td>Updates CLI prompt settings</td>
</tr>
<tr>
<td>crash-info</td>
<td>- crash-info – Includes an asterix at the end of the prompt if the device has crash files in the flash:/crashinfo folder</td>
</tr>
<tr>
<td>show cli</td>
<td>Displays running system information</td>
</tr>
<tr>
<td>cli</td>
<td>- cli – Displays the current mode’s CLI tree</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-management-policy-test)#service show cli
Management Mode mode:
++help [help]
++search
  ++WORD [help search WORD ([detailed|only-show|skip-show|skip-no])]
  ++detailed [help search WORD ([detailed|only-show|skip-show|skip-no])]
  ++only-show [help search WORD ([detailed|only-show|skip-show|skip-no])]
  ++skip-show [help search WORD ([detailed|only-show|skip-show|skip-no])]
  ++skip-no [help search WORD ([detailed|only-show|skip-show|skip-no])]
++show
  ++commands [show commands]
  ++simulate
  ++stats [show simulate stats]
++eval
  ++WORD [show eval WORD]
++debugging [show debugging ([on DEVICE-OR-DOMAIN-NAME])]
  ++cfgd [show debugging cfgd]
  ++on
    ++DEVICE-OR-DOMAIN-NAME [show debugging ([on DEVICE-OR-DOMAIN-NAME])]
    ++fib [show debugging fib([on DEVICE-NAME])]
    ++on
      ++DEVICE-NAME [show debugging fib([on DEVICE-NAME])]
      ++wireless [show debugging wireless ([on DEVICE-OR-DOMAIN-NAME])]
      ++on
--More--
```

Related Commands

```
no
```

Disables the inclusion of an asterix indicator notifying the presence of crash files
This chapter summarizes the RADIUS group, server, and user policy commands in the CLI command structure. Remote Authentication Dial-In User Service (RADIUS) is a client/server protocol and software that enables remote access servers to authenticate users and authorize their access to the network. RADIUS is a distributed client/server system that secures networks against unauthorized access. RADIUS clients send authentication requests to the local RADIUS server containing user authentication and network service access information.

RADIUS enables centralized management of authentication data (usernames and passwords). When a client attempts to associate to a network, the authentication request is sent to the local RADIUS server. The authentication and encryption of communications takes place through the use of a shared secret password (not transmitted over the network).

The local RADIUS server stores the user database locally, and can optionally use a remote user database. It ensures higher accounting performance. It allows the configuration of multiple users, and assigns policies for group authorization.

Controllers and access points allow enforcement of user-based policies. User policies include dynamic VLAN assignment and access based on time of day. A certificate is required for EAP TTLS, PEAP, and TLS RADIUS authentication (configured with the RADIUS service).

Dynamic VLAN assignment is achieved based on the RADIUS server response. A user who associates to WLAN1 (mapped to VLAN1) can be assigned a different VLAN after RADIUS server authentication. This dynamic VLAN assignment overrides the WLAN's VLAN ID to which the user associates.

The chapter is organized into the following sections:

- radius-group
- radius-server-policy
- radius-user-pool-policy

---

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
16.1 radius-group

This section describes RADIUS user group configuration commands.

The local RADIUS server allows the configuration of user groups with common user policies. User group names and associated users are stored in the local database. The user ID in the received access request is mapped to the associated wireless group for authentication. The configuration of groups allows enforcement of the following policies that control user access:

- Assign a VLAN to the user upon successful authentication
- Define start and end of time (HH:MM) when the user is allowed to authenticate
- Define the SSID list to which a user, belonging to this group, is allowed to associate
- Define the days of the week the user is allowed to login
- Rate limit traffic (for non-management users)

RADIUS users are categorized into three groups: normal user, management user, and guest user. A RADIUS group not configured as management or guest is a normal user group. User access and role settings depends on the RADIUS group the user belongs.

Use the (config) instance to configure RADIUS group commands. This command creates a group within the existing RADIUS group. To navigate to the RADIUS group instance, use the following commands:

```
<DEVICE>(config)#radius-group <GROUP-NAME>
```

```
rfs7000-37FABE(config)#radius-group test
```

Radius user group configuration commands:

- guest: Make this group a Guest group
- no: Negate a command or set its defaults
- policy: Radius group access policy configuration
- rate-limit: Set rate limit for group
- clrscr: Clears the display screen
- commit: Commit all changes made in this session
- do: Run commands from Exec mode
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
- help: Description of the interactive help system
- revert: Revert changes
- service: Service Commands
- show: Show running system information
- write: Write running configuration to memory or terminal

```
rfs7000-37FABE(config-radius-group-test)#
```

---

**NOTE:** The RADIUS group name cannot exceed 32 characters, and cannot be modified as part of the group edit process.
The following table summarizes RADIUS group configuration commands:

**Table 16.1** RADIUS-Group-Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>guest</td>
<td>Enables guest access for the newly created group</td>
<td>page 16-4</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 16-10</td>
</tr>
<tr>
<td>policy</td>
<td>Configures RADIUS group access policy parameters</td>
<td>page 16-5</td>
</tr>
<tr>
<td>rate-limit</td>
<td>Sets the default rate limit per user in Kbps, and applies it to all enabled WLANs</td>
<td>page 16-9</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see *Chapter 5, COMMON COMMANDS.*
16.1.1 guest

`radius-group`

Configures this group as a guest (non-management) group. A guest user group has temporary permissions to the controller’s local RADIUS server. You can configure multiple guest user groups, each having a unique set of settings. Guest user groups cannot be made management groups with access and role permissions.

Guest users and policies are used for captive portal authorization to the network.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
```
guest
```

Parameters
None

Examples
```
rfs7000-37FABE(config-radius-group-test)#guest
rfs7000-37FABE(config-radius-group-test)#show context radius-group test guest
rfs7000-37FABE(config-radius-group-test)#
```

Related Commands

```
| no                      | Makes this group a non-guest group |
```

16.1.2 policy

- **radius-group**

  Sets a RADIUS group's authorization settings, such as access day/time, WLANs, etc.

  **NOTE:** A user-based VLAN is effective only if dynamic VLAN authorization is enabled for the WLAN.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`policy [access|day|inactivity-timeout|role|session-time|ssid|time|vlan]`

`policy vlan <1-4094>`

`policy access [all|console|ssh|telnet|web]`

`policy access [all|console|ssh|telnet|web] {all|console|ssh|telnet|web}`

`policy day [all|fr|mo|sa|su|th|tu|we|weekdays] {fr|mo|sa|su|th|tu|we|weekdays}`

`policy inactivity-timeout <60-86400>`

`policy role [device-provisioning-admin|helpdesk|monitor|network-admin|security-admin|superuser|system-admin|web-user-admin]`

`policy session-time <5-144000>`

`policy ssid <SSID>`

`policy time start <HH:MM> end <HH:MM>`

**NOTE:** Access and role settings are applicable only to a management group. They cannot be configured for a RADIUS non-management group.

**Parameters**

- **policy vlan <1-4094>**

  `vlan <1-4094>`

  Sets the guest RADIUS group's VLAN ID from 1 - 4094. The VLAN ID is representative of the shared SSID each group member (user) employs to interoperate within the network (once authenticated by the local RADIUS server).

  **Note:** This option applicable to a guest user group, which has guest access and temporary permissions to the local RADIUS server. The terms of the guest access can be set uniquely for each group. Guest user groups cannot be made management groups with unique access and role permissions.

  **Note:** Enable dynamic VLAN assignment for the WLAN for the VLAN assignment to take effect.
### Policy Commands

**Policy Access**

`policy access [all|console|ssh|telnet|web] {(all|console|ssh|telnet|web)}`

<table>
<thead>
<tr>
<th>Access Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>all</code></td>
<td>Allows all access. Wireless client access to the console, ssh, telnet, and/or Web</td>
</tr>
<tr>
<td><code>console</code></td>
<td>Allows console access only</td>
</tr>
<tr>
<td><code>ssh</code></td>
<td>Allows SSH access only</td>
</tr>
<tr>
<td><code>telnet</code></td>
<td>Allows Telnet access only</td>
</tr>
<tr>
<td><code>web</code></td>
<td>Allows Web access only</td>
</tr>
</tbody>
</table>

These parameters are recursive, and you can provide access to more than one component.

**Policy Role**

`policy role [device-provisioning-admin|helpdesk|monitor|network-admin|security-admin|superuser|system-admin|web-user-admin]`

<table>
<thead>
<tr>
<th>Role Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>device-provisioning-admin</code></td>
<td>Device provisioning administrator. Has privileges to update (provision) device configuration files or firmware. Such updates run the risk of overwriting and losing a devices existing configuration unless the configuration is properly archived.</td>
</tr>
<tr>
<td><code>helpdesk</code></td>
<td>Helpdesk administrator. Performs troubleshooting tasks, such as clear statistics, reboot, create and copy tech support dumps. The helpdesk administrator can also create a guest user account and password for registration. These details can be e-mailed or sent as SMS to a mobile phone.</td>
</tr>
<tr>
<td><code>monitor</code></td>
<td>Monitor. Has read-only access to the network. Can view configuration and statistics except for secret information</td>
</tr>
<tr>
<td><code>network-admin</code></td>
<td>Network administrator. has wired and wireless access to the network. Manages layer 2, layer 3, Wireless, RADIUS server, DHCP server, and Smart RF</td>
</tr>
<tr>
<td><code>security-admin</code></td>
<td>Security administrator. Has full read/write access to the network. Modifies WLAN keys and passphrases</td>
</tr>
<tr>
<td><code>superuser</code></td>
<td>Superuser. Has full access, including halt and delete startup config</td>
</tr>
<tr>
<td><code>system-admin</code></td>
<td>System administrator. Upgrades image, boot partition, time, and manages admin access</td>
</tr>
<tr>
<td><code>web-user-admin</code></td>
<td>Web user administrator. This role is used to create guest users and credentials. The web-user-admin can access only the custom GUI screen and does not have access to the normal CLI and GUI.</td>
</tr>
</tbody>
</table>

**Policy Inactivity Timeout**

`policy inactivity-timeout <60-86400>`

<table>
<thead>
<tr>
<th>Inactivity Timeout</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;60-86400&gt;</code></td>
<td>Configures the inactivity time for this RADIUS group users. If a frame is not received from a client for the specified period, then the client's session is removed. When defined, this value is used instead of the captive-portal inactivity timeout. If the inactivity timeout is not configured in the radius-group context or the captive-portal context, the default timeout (60 seconds) is applied.</td>
</tr>
</tbody>
</table>

- `<60-86400>` – Specify a value from 60 - 86400 seconds. This option is disabled by default.
**policy session-time <5-144000>**

<table>
<thead>
<tr>
<th>session-time &lt;5-144000&gt;</th>
<th>Configures the session duration for client's belonging to a specific vendor group. Once configured, this is the duration for which over-the-air, on-boarded, successfully authenticated devices, belonging to a vendor group, get online access. The session is removed on completion of this duration. The vendor's RADIUS group takes precedence over statically configured group for device registration.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;5-144000&gt; – Specify a value from 5 - 144000 minutes. This option is disabled by default.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> For more information, see configuring device registration with dynamic VLAN assignment.</td>
</tr>
</tbody>
</table>

**policy ssid <SSID>**

<table>
<thead>
<tr>
<th>ssid &lt;SSID&gt;</th>
<th>Sets the Service Set Identifier (SSID) for this guest RADIUS group. Use this command to assign SSIDs that users within this RADIUS group are allowed to associate. Assign SSIDs of those WLANs only that the guest users need to access. This option is not available for a management group.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;SSID&gt; – Specify a case-sensitive alphanumeric SSID, not exceeding 32 characters.</td>
</tr>
</tbody>
</table>

**policy day [all|fr|mo|sa|su|th|tu|we|weekdays] {(fr|mo|sa|su|th|tu|we|weekdays)}**

| day [all|fr|mo|sa|su|th|tu|we|weekdays] | Configures the days on which this guest RADIUS group members can access the local RADIUS resources. The options are recursive, and you can provide access on multiple days. |
|-------------------------------|---------------------------------------------------------------------------------------------------------------|
|                               | • fr – Allows access on Friday only                                                                 |
|                               | • mo – Allows access on Mondays only                                                                    |
|                               | • sa – Allows access on Saturdays only                                                                  |
|                               | • su – Allows access on Sundays only                                                                   |
|                               | • th – Allows access on Thursdays only                                                                  |
|                               | • tu – Allows access on Tuesdays only                                                                  |
|                               | • we – Allows access on Wednesdays only                                                                |
|                               | • weekdays – Allows access on weekdays only (Monday to Friday)                                          |

**policy time start <HH:MM> end <HH:MM>**

<table>
<thead>
<tr>
<th>time start <a href="">HH:MM</a> end <a href="">HH:MM</a></th>
<th>Configures the time when this RADIUS group can access the network</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• start <a href="">HH:MM</a> – Sets the start time in the HH:MM format (for example, 13:30 means the user can login only after 1:30 PM). Specifies the time users, within each listed group, can access the local RADIUS resources.</td>
</tr>
<tr>
<td></td>
<td>• end <a href="">HH:MM</a> – Sets the end time in the HH:MM format (for example, 17:30 means the user is allowed to remain logged in until 5:30 PM). Specifies the time users, within each listed group, lose access to the local RADIUS resources.</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

A management group access policy provides:

- access details
- user roles
- policy’s start and end time

The SSID, day, and VLAN settings are not applicable to a management user group.
Examples

The following example shows a RADIUS guest group settings:

```
rfs7000-37FABE(config-radius-group-test)#policy time start 13:30 end 17:30
rfs7000-37FABE(config-radius-group-test)#policy day all
rfs7000-37FABE(config-radius-group-test)#policy vlan 1
rfs7000-37FABE(config-radius-group-test)#policy ssid test
rfs7000-37FABE(config-radius-group-test)#show context
    radius-group test
        guest
        policy vlan 1
        policy ssid test
        policy day mo
        policy day tu
        policy day we
        policy day th
        policy day fr
        policy day sa
        policy day su
        policy time start 13:30 end 17:30
rfs7000-37FABE(config-radius-group-test)#
```

The following example shows a RADIUS management group settings:

```
rfs7000-37FABE(config-radius-group-management)#policy access console ssh telnet
rfs7000-37FABE(config-radius-group-management)#policy role network-admin
rfs7000-37FABE(config-radius-group-management)#policy time start 9:30 end 20:30
rfs7000-37FABE(config-radius-group-management)#show context
    radius-group management
        policy time start 9:30 end 20:30
        policy access console ssh telnet web
        policy role network-admin
rfs7000-37FABE(config-radius-group-management)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes or modifies a RADIUS group’s access settings</td>
</tr>
</tbody>
</table>
### 16.1.3 rate-limit

Sets the rate limit for the guest RADIUS server group

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
rate-limit [from-air|to-air] <100-1000000>
```

#### Parameters

- `rate-limit [from-air|to-air] <100-1000000>`

#### Examples

```
rfs7000-37FABE(config-radius-group-test)#rate-limit to-air 200
rfs7000-37FABE(config-radius-group-test)#show context
radius-group test
guest
policy vlan 1
policy ssid test
policy day mo
policy day tu
policy day we
policy day th
policy day fr
policy day sa
policy day su
rate-limit to-air 200
policy time start 13:30 end 17:30
rfs7000-37FABE(config-radius-group-test)#
```

#### Related Commands

- `no` Removes the RADIUS guest group’s rate limits

#### NOTE:
The rate-limit setting is not applicable to a management group.

<table>
<thead>
<tr>
<th>to-air &lt;100-1000000&gt;</th>
<th>Sets the rate limit in the downlink direction, from the network to the wireless client</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;100-1000000&gt; – Specify the rate from 100 - 1000000 Kbps.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>from-air &lt;100-1000000&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets the rate limit in the uplink direction, from the wireless client to the network</td>
</tr>
<tr>
<td>&lt;100-1000000&gt; – Specify the rate from 100 - 1000000 Kbps.</td>
</tr>
</tbody>
</table>
16.1.4 no

Negates a command or sets its default. Removes or modifies the RADIUS group policy settings. When used in the config RADIUS group mode, the no command removes or modifies the following settings: access type, access days, role type, VLAN ID, and SSID.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [guest|policy|rate-limit]

no policy [access|day|inactivity-timeout|role|session-time|ssid|time|vlan]

no policy access [all|console|ssh|telnet|web]

no policy day [all|fr|mo|sa|su|th|tu|we|weekdays]

no policy session-time

no policy ssid [<SSID>|all]

no policy [inactivity-timeout|role|time|vlan]

no rate-limit [from-air|to-air]

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Negates a command or sets its default. Removes or modifies the RADIUS group policy settings. When used in the config RADIUS group mode, the no command removes or modifies the following settings: access type, access days, role type, VLAN ID, and SSID. |

Examples

The following example shows the RADIUS guest group ‘test’ settings before the ‘no’ commands are executed:

```
rfs7000-37FABE(config-radius-group-test)#show context
radius-group test
  guest
    policy vlan 1
    policy ssid test
    policy day mo
    policy day tu
    policy day we
    policy day th
    policy day fr
    policy day sa
    policy day su
    rate-limit to-air 200
    policy time start 13:30 end 17:30
```

```
rfs7000-37FABE(config-radius-group-test)#no guest
```

```
rfs7000-37FABE(config-radius-group-test)#no rate-limit to-air
```

```
rfs7000-37FABE(config-radius-group-test)#no policy day all
```
The following example shows the RADIUS guest group 'test' settings after the 'no' commands are executed:

```
rfs7000-37FABE(config-radius-group-test)#show context
radius-group test
  policy vlan 1
  policy ssid test
  policy time start 13:30 end 17:30
rfs7000-37FABE(config-radius-group-test)#
```
16.2 radius-server-policy

**RADIUS-POLICY**

Creates an onboard device RADIUS server policy and enters its configuration mode

A RADIUS server policy is a unique authentication and authorization configuration that receives user connection requests, authenticates users, and returns configuration information necessary for the RADIUS client to deliver service to the user. The client is the entity with authentication information requiring validation. The local RADIUS server has access to a database of authentication information used to validate the client's authentication request.

The local RADIUS server uses authentication schemes like PAP, CHAP, or EAP to verify and confirm information provided by a user. The user's proof of identification is verified, along with, optionally, other information. A local RADIUS server policy can also be configured to refer to an external Lightweight Directory Access Protocol (LDAP) resource to verify a user's credentials.

Use the (config) instance to configure RADIUS-Server-Policy related parameters. To navigate to the RADIUS-Server-Policy instance, use the following commands:

```bash
<rfs7000-37FABE>(config)#radius-server-policy <POLICY-NAME>
```

The following table summarizes RADIUS server policy configuration commands:

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>authentication</code></td>
<td>Configures RADIUS authentication settings</td>
<td>page 16-14</td>
</tr>
<tr>
<td><code>bypass</code></td>
<td>Enables bypassing of CRL check</td>
<td>page 16-16</td>
</tr>
<tr>
<td><code>chase-referral</code></td>
<td>Enables LDAP server referral chasing</td>
<td>page 16-17</td>
</tr>
<tr>
<td><code>crl-check</code></td>
<td>Enables a certificate revocation list (CRL) check</td>
<td>page 16-18</td>
</tr>
<tr>
<td><code>ldap-agent</code></td>
<td>LDAP Agent configuration parameters</td>
<td></td>
</tr>
<tr>
<td><code>ldap-group-verification</code></td>
<td>Enable LDAP Group Verification setting</td>
<td></td>
</tr>
<tr>
<td><code>ldap-server</code></td>
<td>LDAP server parameters</td>
<td></td>
</tr>
<tr>
<td><code>local</code></td>
<td>RADIUS local realm</td>
<td></td>
</tr>
<tr>
<td><code>nas</code></td>
<td>RADIUS client</td>
<td></td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negate a command or set its defaults</td>
<td></td>
</tr>
<tr>
<td><code>proxy</code></td>
<td>RADIUS proxy server</td>
<td></td>
</tr>
<tr>
<td><code>session-resumption</code></td>
<td>Enable session resumption/fast reauthentication by</td>
<td></td>
</tr>
<tr>
<td></td>
<td>using cached attributes</td>
<td></td>
</tr>
<tr>
<td><code>termination</code></td>
<td>Enable Eap termination for proxy requests</td>
<td></td>
</tr>
<tr>
<td><code>use</code></td>
<td>Set setting to use</td>
<td></td>
</tr>
<tr>
<td><code>clrscr</code></td>
<td>Clears the display screen</td>
<td></td>
</tr>
<tr>
<td><code>commit</code></td>
<td>Commit all changes made in this session</td>
<td></td>
</tr>
<tr>
<td><code>do</code></td>
<td>Run commands from Exec mode</td>
<td></td>
</tr>
<tr>
<td><code>end</code></td>
<td>End current mode and change to EXEC mode</td>
<td></td>
</tr>
<tr>
<td><code>exit</code></td>
<td>End current mode and down to previous mode</td>
<td></td>
</tr>
<tr>
<td><code>help</code></td>
<td>Description of the interactive help system</td>
<td></td>
</tr>
<tr>
<td><code>revert</code></td>
<td>Revert changes</td>
<td></td>
</tr>
<tr>
<td><code>service</code></td>
<td>Service Commands</td>
<td></td>
</tr>
<tr>
<td><code>show</code></td>
<td>Show running system information</td>
<td></td>
</tr>
<tr>
<td><code>write</code></td>
<td>Write running configuration to memory or terminal</td>
<td></td>
</tr>
</tbody>
</table>
### Table 16.2 RADIUS-Server-Policy-Config Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ldap-agent</td>
<td>Configures the LDAP agent’s settings</td>
<td>page 16-19</td>
</tr>
<tr>
<td>ldap-group-verification</td>
<td>Enables LDAP group verification</td>
<td>page 16-21</td>
</tr>
<tr>
<td>ldap-server</td>
<td>Configures the LDAP server’s settings</td>
<td>page 16-22</td>
</tr>
<tr>
<td>local</td>
<td>Configures a local RADIUS realm</td>
<td>page 16-25</td>
</tr>
<tr>
<td>nas</td>
<td>Configures the key sent to a RADIUS client</td>
<td>page 16-26</td>
</tr>
<tr>
<td>no</td>
<td>Removes or resets the RADIUS server policy’s settings</td>
<td>page 16-27</td>
</tr>
<tr>
<td>proxy</td>
<td>Configures the RADIUS proxy server’s settings</td>
<td>page 16-29</td>
</tr>
<tr>
<td>session-resumption</td>
<td>Enables session resumption</td>
<td>page 16-31</td>
</tr>
<tr>
<td>termination</td>
<td>Enables EAP termination on this current RADIUS server policy. When enabled, EAP authentication is terminated at the controller level.</td>
<td>page 16-32</td>
</tr>
<tr>
<td>use</td>
<td>Defines settings used with the RADIUS server policy</td>
<td>page 16-33</td>
</tr>
</tbody>
</table>
### 16.2.1 authentication

#### radius-server-policy

Specifies the RADIUS datasource used for user authentication. Options include local for the local user database or LDAP for a remote LDAP resource.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
authentication [data-source|eap-auth-type]
authentication data-source [ldap|local]
authentication data-source [ldap {fallback}|local] { (ssid <SSID> precedence <1-5000>) }
```

**Parameters**

- **authentication data-source [ldap {fallback}|local] { (ssid <SSID> precedence <1-5000>) }**

<table>
<thead>
<tr>
<th>data-source</th>
<th>The RADIUS server can either use the local database or an external LDAP server to authenticate a user. It is necessary to specify the data source. The options are: LDAP and local.</th>
</tr>
</thead>
</table>
| ldap fallback | Uses a remote LDAP server as the data source  
- **fallback** — Optional. Enables fallback to local authentication. This feature ensures that if the designated external LDAP resource were to fail or become unavailable, the client is authenticated against the local RADIUS resource. This option is disabled by default.  
**Note:** When using LDAP as the authentication external source, PEAP-MSCHAPv2 authentication type can be used only if the LDAP server returns the password as plain-text. PEAP-MSCHAPv2 authentication is not supported if the LDAP server returns encrypted passwords. This restriction does not apply for Microsoft’s Active Directory server. |
| local | Uses the local user database to authenticate a user. This is the default setting. |
| ssid <SSID> precedence <1-5000> | The following keywords are recursive and common to both ‘ldap’ and ‘local’ parameters:  
- **ssid** — Optional. Associates the data source, selected in the previous step, with a SSID  
- **<SSID>** — Specify the SSID for this authentication data source. The SSID is case sensitive and should not exceed 32 characters in length. Do not use any of the following characters (<> | " & \ ? ,).  
- **precedence <SSID>** — Sets the precedence for this authentication rule. The precedence value allows systematic evaluation and application of rules. Rules with the lowest precedence receive the highest priority.  
- **<1-5000>** — Specify a precedence from 1- 5000.  
**Note:** Specifying the SSID allows the RADIUS server to use the SSID attribute in access requests to determine the data source to use. This option is applicable to onboard RADIUS servers only. |
The RADIUS-POLICY command is used to configure RADIUS (Remote Authentication Dial-In User Service) server policies for user authentication. The syntax for the command is:

```
authentication eap-auth-type [all|peap-gtc|peap-mschapv2|tls|ttls-md5|ttls-mschapv2|ttls-pap]
```

### eap-auth-type

- **all**
  - Enables both TTLS and PEAP authentication. This is the default setting.
- **peap-gtc**
  - Enables PEAP with default authentication using GTC.
- **peap-mschapv2**
  - Enables PEAP with default authentication using MSCHAPv2.
  - **Note:** When using LDAP as the authentication external source, PEAP-MSCHAPv2 authentication type can be used only if the LDAP server returns the password as plain-text. PEAP-MSCHAPv2 authentication is not supported if the LDAP server returns encrypted passwords. This restriction does not apply for Microsoft's Active Directory server.
- **tls**
  - Enables TLS as the EAP type.
- **ttls-md5**
  - Enables TTLS with default authentication using md5.
- **ttls-mschapv2**
  - Enables TTLS with default authentication using MSCHAPv2.
- **ttls-pap**
  - Enables TTLS with default authentication using PAP.

### Examples

```
rfs7000-37FABE(config-radius-server-policy-test)#authentication eap-auth-type tls
```

```
rfs7000-37FABE(config-radius-server-policy-test)#show context radius-server-policy test
  authentication eap-auth-type tls
rfs7000-37FABE(config-radius-server-policy-test)#
```

### Related Commands

- **no**
  - Removes the RADIUS authentication settings.
16.2.2 bypass

➤ radius-server-policy

Enables bypassing a CRL check. When enabled, this feature bypasses checks for missing and expired CRLs. This option is enabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

bypass [crl-check|expired-crl]

Parameters

- bypass [crl-check|expired-crl]

| bypass [crl-check|expired-crl] | Bypasses CRL check based on the parameters passed |
|---------------------------------|-----------------------------------------------|
|                                 | • crl-check – Bypasses CRL check of missing CRLs |
|                                 | • expired-crl – Bypasses CRL check of expired CRLs |

Note: A CRL is a list of certificates that have been revoked or are no longer valid.

Examples

nx9500-6C8809(config-radius-server-policy-test)#bypass crl-check

nx9500-6C8809(config-radius-server-policy-test)#no bypass crl-check

nx9500-6C8809(config-radius-server-policy-test)#show context radius-server-policy test
  no bypass crl-check

nx9500-6C8809(config-radius-server-policy-test)#

Related Commands

| no | Disables bypassing of checking for missing CRLs or expired CRLs |
16.2.3 `chase-referral`

- `radius-server-policy`

Enables chasing of referrals from an external LDAP server resource.

An LDAP referral is a controller or service platform’s way of indicating to a client it does not hold the section of the directory tree where a requested content object resides. The referral is the controller or service platform’s direction to the client a different location is more likely to hold the object, which the client uses as the basis for a DNS search for a domain controller. Ideally, referrals always reference a domain controller that indeed holds the object. However, it is possible for the domain controller to generate another referral, although it usually does not take long to discover the object does not exist and inform the client.

This feature is enabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
chase-referral
```

**Parameters**
None

**Examples**
```
rfs7000-37FABE(config-radius-server-policy-test)#chase-referral
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables LDAP server referral chasing</td>
</tr>
</tbody>
</table>
### 16.2.4 crl-check

*radius-server-policy*

Enables a *certificate revocation list* (CRL) check on this RADIUS server policy.

A CRL is a list of revoked certificates issued and subsequently revoked by a *Certification Authority* (CA). Certificates can be revoked for a number of reasons including failure or compromise of a device using a certificate, a compromise of a certificate key pair or errors within an issued certificate. The mechanism used for certificate revocation depends on the CA.

This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

crl-check

**Parameters**

None

**Examples**

```bash
rfs7000-37FABE(config-radius-server-policy-test)#crl-check
rfs7000-37FABE(config-radius-server-policy-test)#show context
radius-server-policy test
  authentication eap-auth-type tls
crl-check
rfs7000-37FABE(config-radius-server-policy-test)#
```

**Related Commands**

| no | Enables CRL check on a RADIUS server policy |
### 16.2.5 ldap-agent

`radius-server-policy`

Configures the LDAP agent's settings in the RADIUS server policy context.

When a user's credentials are stored on an external LDAP server, the local RADIUS server cannot successfully conduct PEAP-MSCHAPv2 authentication, since it is not aware of the user's credentials maintained on the external LDAP server resource. Therefore, up to two LDAP agents can be provided locally so remote LDAP authentication can be successfully accomplished on the remote LDAP resource (using credentials maintained locally).

This feature is available to all controller, service platforms and access point models, with the exception of AP6511 and AP6521 models running in standalone AP or virtual controller AP mode. However, this feature is supported by dependent mode AP6511 and AP6521 model access points when adopted and managed by a controller or service platform.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```shell
ldap-agent [join|join-retry-timeout|primary|secondary]
ldap-agent [join {on <DEVICE-NAME>}|join-retry-timeout <60-300>]
ldap-agent [primary|secondary] domain-name <LDAP-DOMAIN-NAME> domain-admin-user <ADMIN-USER-NAME> domain-admin-password [0 <WORD>|2 <WORD>]
```

#### Parameters

- `ldap-agent [join {on <DEVICE-NAME>}|join-retry-timeout <60-300>]`

<table>
<thead>
<tr>
<th>ldap-agent</th>
<th>Configures the LDAP agent's settings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>join</strong></td>
<td>Initiates the join process, which binds the RADIUS server with the LDAP server's (Windows) domain. When successful, the hostname (name of the AP, wireless controller, or service platform) is added to the LDAP server’s Active Directory.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>- Optional. Specifies the device name</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;DEVICE-NAME&gt;</code> — Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td><strong>Note:</strong> To confirm the join status of a controller, use the <code>show &gt; ldap-agent &gt; join-status</code> command.</td>
<td></td>
</tr>
</tbody>
</table>

- `join-retry-timeout <60-300>`

<table>
<thead>
<tr>
<th><strong>join-retry-timeout &lt;60-300&gt;</strong></th>
<th>If the join process fails (i.e. the RADIUS server fails to join the LDAP server’s domain), the process is retried after a specified interval. This command configures the interval (in seconds) between two successive join attempts.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- <code>&lt;60-300&gt;</code> — Set the timeout value from 60 - 300 seconds. The default is 60 seconds.</td>
</tr>
<tr>
<td><strong>Note:</strong> A retry timer is initiated as soon as the join process starts, which tracks the time lapse in case of a failure.</td>
<td></td>
</tr>
</tbody>
</table>
- `ldap-agent [primary|secondary] domain-name <LDAP-DOMAIN-NAME> domain-admin-user <ADMIN-USER-NAME> domain-admin-password [0 <WORD>|2 <WORD>]`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ldap-agent</code></td>
<td>Configures the LDAP agent’s settings</td>
</tr>
<tr>
<td><code>primary</code></td>
<td>Configures the primary LDAP server details, such as domain name, user name, and password. The RADIUS server uses these credentials to bind with the primary LDAP server.</td>
</tr>
<tr>
<td><code>secondary</code></td>
<td>Configures the secondary LDAP server details, such as domain name, user name, and password. The RADIUS server uses these credentials to bind with the secondary LDAP server.</td>
</tr>
<tr>
<td><code>domain-name</code></td>
<td>This keyword is common to both the ‘primary’ and ‘secondary’ parameters.</td>
</tr>
<tr>
<td><code>&lt;LDAP-DOMAIN-NAME&gt;</code></td>
<td>• domain-name – Configures the primary or secondary LDAP server’s domain name</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;LDAP-DOMAIN-NAME&gt;</code> – Specify the domain name.</td>
</tr>
<tr>
<td><code>domain-admin-user</code></td>
<td>This keyword is common to both the ‘primary’ and ‘secondary’ parameters.</td>
</tr>
<tr>
<td><code>&lt;ADMIN-USER-NAME&gt;</code></td>
<td>• domain-admin-user – Configures the primary or secondary LDAP server’s admin user name</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;ADMIN-USER-NAME&gt;</code> – Specify the admin user’s name.</td>
</tr>
<tr>
<td><code>domain-admin-password</code></td>
<td>This keyword is common to both the ‘primary’ and ‘secondary’ parameters.</td>
</tr>
<tr>
<td>`[0 &lt;WORD&gt;</td>
<td>2 &lt;WORD&gt;]`</td>
</tr>
<tr>
<td></td>
<td>• 0 &lt;WORD&gt; – Specifies the password in the unencrypted format</td>
</tr>
<tr>
<td></td>
<td>• 2 &lt;WORD&gt; – Specifies the password in the encrypted format</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-radius-server-policy-test)#ldap-agent primary domain-name test domain-admin-user Administrator domain-admin-password 0 test@123
rfs4000-229D58(config-radius-server-policy-test)#

rfs4000-229D58(config-radius-server-policy-test)#show context
radius-server-policy test
  ldap-agent primary domain-name test domain-admin-user Administrator domain-admin-password 0 test@123
rfs4000-229D58(config-radius-server-policy-test)#
```

**Related Commands**

- `no` Removes LDAP agent settings from this RADIUS server policy
16.2.6 ldap-group-verification

Enables LDAP group verification settings on this RADIUS server policy. This option is enabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ldap-group-verification

Parameters

None

Examples

rfs7000-37FABE(config-radius-server-policy-test)#ldap-group-verification
rfs7000-37FABE(config-radius-server-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables LDAP group verification settings</td>
</tr>
</tbody>
</table>
### 16.2.7 ldap-server

> radius-server-policy

Configures the LDAP server’s settings. Configuring LDAP server allows users to login and authenticate from anywhere on the network.

Administrators have the option of using the local RADIUS server to authenticate users against an external LDAP server resource. Using an external LDAP user database allows the centralization of user information and reduces administrative user management overhead making RADIUS authorization more secure and efficient.

RADIUS is not just a database. It is a protocol for asking intelligent questions to a user database (like LDAP). LDAP however is just a database of user credentials used optionally with the local RADIUS server to free up resources and manage user credentials from a secure remote location. It is the local RADIUS resources that provide the tools to perform user authentication and authorize users based on complex checks and logic. A LDAP user database alone cannot perform such complex authorization checks.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```bash
ldap-server {dead-period|primary|secondary}
ldap-server dead-period <0-600>
ldap-server [primary|secondary] host <IP> port <1-65535> login <LOGIN-NAME> bind-dn <BIND-DN> base-dn <BASE-DN> passwd [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>] passwd-attr <ATTR> group-attr <ATTR> group-filter <FILTER> group-membership <WORD> {net-timeout <1-10>|start-tls net-timeout <1-10>|tls-mode net-timeout <1-10>}
```

**Parameters**

- **ldap-server dead-period <0-600>**
  - `dead-period <0-600>`
    - Sets an interval, in seconds, during which the local server will not contact its LDAP server resource once its been defined as unavailable. A dead period is only implemented when additional LDAP servers are configured and available.
    - `<0-600>` – Specify a value from 0 - 600 seconds. The default is 300 seconds.

- **ldap-server [primary|secondary] host <IP> port <1-65535> login <LOGIN-NAME> bind-dn <BIND-DN> base-dn <BASE-DN> passwd [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>] passwd-attr <ATTR> group-attr <ATTR> group-filter <FILTER> group-membership <WORD> {net-timeout <1-10>|start-tls net-timeout <1-10>|tls-mode net-timeout <1-10>}

<table>
<thead>
<tr>
<th>ldap primary</th>
<th>Configures the primary LDAP server settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>ldap secondary</td>
<td>Configures the secondary LDAP server settings</td>
</tr>
<tr>
<td>host &lt;IP&gt;</td>
<td>Specifies the LDAP host’s IP address</td>
</tr>
<tr>
<td>port &lt;1-65535&gt;</td>
<td>Configures the LDAP server port</td>
</tr>
<tr>
<td>login &lt;LOGIN-NAME&gt;</td>
<td>Configures the login name of a user to access the LDAP server</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;LOGIN-NAME&gt;</code> – Specify a login ID (should not exceed 127 characters).</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>bind-dn &lt;BIND-DN&gt;</td>
<td>Configures a distinguished bind name. This is the distinguished name (DN) used to bind with the LDAP server. The DN is the name that uniquely identifies an entry in the LDAP directory. A DN is made up of attribute value pairs, separated by commas.</td>
</tr>
<tr>
<td></td>
<td>• &lt;BIND-DN&gt; – Specify a bind name (should not exceed 127 characters).</td>
</tr>
<tr>
<td>base-dn &lt;BASE-DN&gt;</td>
<td>Configures a distinguished base name. This is the DN that establishes the base object for the search. The base object is the point in the LDAP tree at which to start searching. LDAP DN is made up of attributes. The first component of the DN is referred to as the Relative Distinguished Name (RDN).</td>
</tr>
<tr>
<td></td>
<td>• &lt;BASE-DN&gt; – Specify a base name (should not exceed 127 characters).</td>
</tr>
<tr>
<td>passwd [0 &lt;PASSWORD&gt;</td>
<td>Sets a valid password for the LDAP server.</td>
</tr>
<tr>
<td></td>
<td>• 0 &lt;PASSWORD&gt; – Sets an UNENCRYPTED password</td>
</tr>
<tr>
<td></td>
<td>• 2 &lt;ENCRYPTED-PASSWORD&gt; – Sets an ENCRYPTED password</td>
</tr>
<tr>
<td></td>
<td>• &lt;PASSWORD&gt; – Sets the LDAP server bind password, specified UNENCRYPTED, with a maximum size of 31 characters</td>
</tr>
<tr>
<td>passwd-attr &lt;ATTR&gt;</td>
<td>Specify the LDAP server password attribute (should not exceed 63 characters).</td>
</tr>
<tr>
<td>group-attr &lt;ATTR&gt;</td>
<td>Specify a name to configure group attributes (should not exceed 31 characters). LDAP systems have the facility to poll dynamic groups. In an LDAP dynamic group an administrator can specify search criteria. All users matching the search criteria are considered a member of this dynamic group. Specify a group attribute used by the LDAP server. An attribute could be a group name, group ID, password or group membership name.</td>
</tr>
<tr>
<td>group-filter &lt;FILTER&gt;</td>
<td>Specify a name for the group filter attribute (should not exceed 255 characters). This filter is typically used for security role-to-group assignments and specifies the property to look up groups in the directory service.</td>
</tr>
<tr>
<td>group-membership &lt;WORD&gt;</td>
<td>Specify a name for the group membership attribute (should not exceed 63 characters). This attribute is sent to the LDAP server when authenticating users.</td>
</tr>
<tr>
<td>net-time &lt;1-10&gt;</td>
<td>Optional. Select a value from 1 - 10 to configure the network timeout (number of seconds to wait for a response from the target primary or secondary LDAP server). The default is 10 seconds.</td>
</tr>
<tr>
<td>start-tls net-timeout &lt;1-10&gt;</td>
<td>Optional. Select a value from 1 - 10 to configure the network timeout for secure communication using start_tls support on the external LDAP server.</td>
</tr>
<tr>
<td>tls-mode net-timeout &lt;1-10&gt;</td>
<td>Optional. Select a value from 1 - 10 to configure the network timeout for secure communication using tls_mode support on the external LDAP server.</td>
</tr>
</tbody>
</table>
Examples

```
# ldap-server dead-period 100
rfs7000-37FABE(config-radius-server-policy-test)#
```

```
# ldap-server primary host 172.16.10.19 port 162 login test bind-dn bind-dn1 base-dn base-dn1 passwd 0 test@123 passwd-attr test123 group-attr group1 group-filter groupfilter1 group-membership groupmembership1 net-timeout 2
rfs7000-37FABE(config-radius-server-policy-test)#
```

```
# show context radius-server-policy test
  authentication eap-auth-type tls
crl-check
  ldap-server primary host 172.16.10.19 port 162 login "test" bind-dn "bind-dn1" base-dn "base-dn1" passwd 0 test@123 passwd-attr test123 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
  ldap-server dead-period 100
rfs7000-37FABE(config-radius-server-policy-test)#
```

Related Commands

```
no
```

Disables the LDAP server parameters
16.2.8 local

radius-server-policy

Configures a local RADIUS realm on this RADIUS server policy

When the local RADIUS server receives a request for a user name with a realm, the server references a table of realms. If the realm is known, the server proxies the request to the RADIUS server.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

local realm <RADIUS-REALM>

Parameters

- local realm <RADIUS-REALM>

<table>
<thead>
<tr>
<th>realm &lt;RADIUS-REALM&gt;</th>
<th>Configures a local RADIUS realm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;RADIUS-REALM&gt; — Sets a local RADIUS realm name (a string not exceeding 50 characters)</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-radius-server-policy-test)#local realm realm1

rfs7000-37FABE(config-radius-server-policy-test)#show context
radius-server-policy test
  authentication eap-auth-type tls
crl-check
local realm realm1
ldap-server primary host 172.16.10.19 port 162 login "test" bind-dn "bind-dn1" base-dn "base-dn1" passwd 0 test@123 passwd-attr test123 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
ldap-server dead-period 100
rfs7000-37FABE(config-radius-server-policy-test)#

Related Commands

no

Removes the RADIUS local realm
16.2.9 nas

radius-server-policy

Configures the key sent to a RADIUS client

A RADIUS client is a mechanism to communicate with a central server to authenticate users and authorize access to the controller, service platform or Access Point managed network.

The client and server share a secret (a password). That shared secret followed by the request authenticator is put through a MD5 hash algorithm to create a 16 octet value which is XORed with the password entered by the user. If the user password is greater than 16 octets, additional MD5 calculations are performed, using the previous ciphertext instead of the request authenticator. The server receives a RADIUS access request packet and verifies the server possesses a shared secret for the client. If the server does not possess a shared secret for the client, the request is dropped. If the client received a verified access accept packet, the username and password are considered correct, and the user is authenticated. If the client receives a verified access reject message, the username and password are considered to be incorrect, and the user is not authenticated.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

\[\text{nas <IP/M> secret [0|2]<LINE>}\]

\[\text{nas <IP/M> secret [0 <LINE>|2 <LINE>|<LINE>]}\]

Parameters

- \text{nas <IP/M> secret [0 <LINE>|2<LINE>]}©

<table>
<thead>
<tr>
<th>&lt;IP/M&gt;</th>
<th>Sets the RADIUS client's IP address</th>
</tr>
</thead>
</table>
| • <IP/M> – Sets the RADIUS client's IP address in the A.B.C.D/M format

| secret [0 <LINE>2 <LINE>|<LINE>] | Sets the RADIUS client’s shared secret. Use one of the following options: |
|-----------------------------------|------------------------------------------------------------------------|
| • 0 <LINE> – Sets an UNENCRYPTED secret                                           |
| • 2 <LINE> – Sets an ENCRYPTED secret                                                |
| • <LINE> – Defines the secret (client shared secret) up to 64 characters               |

Examples

rfs7000-37FABE(config-radius-server-policy-test)#nas 172.16.10.10/24 secret 0 wirelesswell

rfs7000-37FABE(config-radius-server-policy-test)#show context
radius-server-policy test
  authentication eap-auth-type tls
crl-check
nas 172.16.10.10/24 secret 0 wirelesswell
local realm realm1
ldap-server primary host 172.16.10.19 port 162 login "test" bind-dn "bind-dn1" base-dn "base-dn1" passwd 0 test@123 passwd-attr test123 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
ldap-server dead-period 100
rfs7000-37FABE(config-radius-server-policy-test)#

Related Commands

\[\text{no}\] - Removes a RADIUS server's client on a RADIUS server policy
Negates a command or reverts back to default settings. When used with in the config RADIUS server policy mode, the `no` command removes settings, such as crl-check, LDAP group verification, RADIUS client, etc.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no [authentication|bypass|chase-referral|clr-check|ldap-agent|ldap-group-verification|ldap-server|local|nas|proxy|session-resumption|termination|use]
```

```
no bypass [crl-check|expired-crl]
```

```
no authentication [data-source|eap]
```

```
no authentication [data-source {ldap {fallback}|local|ssid}|eap configuration]
```

```
no [chase-referral|clr-check|ldap-group-verification|nas <IP/M>|session-resumption]
```

```
no ldap-agent [join-retry-timeout|primary|secondary]
```

```
no local realm [<REALM-NAME>|all]
```

```
no proxy [realm <REALM-NAME>|retry-count|retry-delay]
```

```
no ldap-server [dead-period|primary|secondary]
```

```
no termination
```

```
no use [radius-group [<RAD-GROUP-NAME>|all]|radius-user-pool-policy [<RAD-USER-POOL-NAME>|all]]
```

**Parameters**

- `no <PARAMETERS>`

**Examples**

The following example shows the RADIUS server policy 'test' settings before the 'no' commands are executed:

```
rfs7000-37FABE(config-radius-server-policy-test)#show context
rfs7000-37FABE(config-radius-server-policy-test)#radius-server-policy test
authentication eap-auth-type tls
    crl-check
    nas 172.16.10.10/24 secret 0 wirelesswell
    local realm realml
    ldap-server primary host 172.16.10.19 port 162 login "test" bind-dn "bind-dn1" base-dn "bas-dn1" passwd 0 test@123 passwd-attr test123 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
    ldap-server dead-period 100
rfs7000-37FABE(config-radius-server-policy-test)#
```

The following example shows the RADIUS server policy 'test' settings after the 'no' commands are executed:

```
rfs7000-37FABE(config-radius-server-policy-test)#no authentication eap configuration
rfs7000-37FABE(config-radius-server-policy-test)#no crl-check
rfs7000-37FABE(config-radius-server-policy-test)#no local realm realml
rfs7000-37FABE(config-radius-server-policy-test)#no nas 172.16.10.10/24
rfs7000-37FABE(config-radius-server-policy-test)#no ldap-server dead-period
```
The following example shows the RADIUS server policy ‘test’ settings after the ‘no’ commands are executed:

```
rfs7000-37FABE(config-radius-server-policy-test)#show context
radius-server-policy test
ldap-server primary host 172.16.10.19 port 162 login "test" bind-dn "bind-dn1" base-dn "bas-dn1" passwd 0 test@123 passwd-attr test123 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
rfs7000-37FABE(config-radius-server-policy-test)#
```
16.2.11 proxy

radius-server-policy

Configures a proxy RADIUS server based on the realm/suffix. The realm identifies where the RADIUS server forwards AAA requests for processing.

A user’s access request is sent to a proxy RADIUS server if it cannot be authenticated by the local RADIUS resources. The proxy server checks the information in the user access request and either accepts or rejects the request. If the proxy server accepts the request, it returns configuration information specifying the type of connection service required to authenticate the user.

The RADIUS proxy appears to act as a RADIUS server to NAS, whereas the proxy appears to act as a RADIUS client to the RADIUS server.

When the proxy server receives a request for a user name with a realm, the server references a table of realms. If the realm is known, the server proxies the request to the RADIUS server.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

proxy [realm|retry-count|retry-delay]

proxy realm <REALM-NAME> server <IP> port <1024-65535> secret
[0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]

proxy retry-count <3-6>

proxy retry-delay <5-10>

Parameters

- proxy realm <REALM-NAME> server <IP> port <1024-65535> secret [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>proxy realm &lt;REALM-NAME&gt;</td>
<td>Configures the realm name</td>
</tr>
<tr>
<td>server &lt;IP&gt;</td>
<td>Configures the proxy server’s IP address. This is the address of server checking the information in the user access request and either accepting or rejecting the request on behalf of the local RADIUS server.</td>
</tr>
<tr>
<td>port &lt;1024-65535&gt;</td>
<td>Configures the proxy server’s port. This is the TCP/IP port number for the server that acts as a data source for the proxy server.</td>
</tr>
<tr>
<td>secret [0 &lt;PASSWORD&gt;</td>
<td>2 &lt;ENCRYPTED-PASSWORD&gt;</td>
</tr>
<tr>
<td></td>
<td>0 &lt;PASSWORD&gt; – Sets an UNENCRYPTED password</td>
</tr>
<tr>
<td></td>
<td>2 &lt;ENCRYPTED-PASSWORD&gt; – Sets an ENCRYPTED password</td>
</tr>
<tr>
<td></td>
<td>&lt;PASSWORD&gt; – Sets the proxy server shared secret value</td>
</tr>
</tbody>
</table>
• proxy retry-count <3-6>

retry-count <3-6> | Sets the proxy server’s retry count. This is the maximum number attempts made by a controller’s RADIUS server to connect to the proxy server.
| • <3-6> – Sets a value from 3 - 6 (default is 3 counts)

• proxy retry-delay <5-10>

retry-delay <5-10> | Sets the proxy server’s retry delay count. This is the interval the controller’s RADIUS server waits before making an additional connection attempt.
| • <5-10> – Sets a value from 5 - 10 seconds (default is 5 seconds)

Usage Guidelines
A maximum of five RADIUS proxy servers can be configured. The proxy server attempts six retries before it times out. The retry count defines the number of times RADIUS requests are transmitted before giving up. The timeout value is the defines the interval between successive retransmission of a RADIUS request (in case of no reply).

Examples
rfs7000-37FABE(config-radius-server-policy-test)#proxy realm test1 server 172.16.10.7 port 1025 secret 0 test1123
rfs7000-37FABE(config-radius-server-policy-test)#proxy retry-count 4
rfs7000-37FABE(config-radius-server-policy-test)#proxy retry-delay 8
rfs7000-37FABE(config-radius-server-policy-test)#show context radius-server-policy test
proxy retry-delay 8
proxy retry-count 4
proxy realm test1 server 172.16.10.7 port 1025 secret 0 test1123
ldap-server primary host 172.16.10.19 port 162 login "test" bind-dn "bind-dn1" base-dn "bas-dn1" passwd 0 test@123 passwd-attr test123 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
rfs7000-37FABE(config-radius-server-policy-test)#

Related Commands

no | Removes or resets the RADIUS proxy server’s settings
16.2.12 session-resumption

radius-server-policy

Enables session resumption or fast re-authentication by using cached attributes. This feature controls the volume and duration cached data is maintained by the server policy, upon termination of a server policy session. The availability and quick retrieval of the cached data speeds up session resumption.

This feature is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
session-resumption {lifetime|max-entries}
```

```
session-resumption {lifetime <1-24> {max-entries <10-1024>}}|max-entries <10-1024>}
```

Parameters

- `session-resumption {lifetime <1-24> {max-entries <10-1024>}}|max-entries <10-1024>}

<table>
<thead>
<tr>
<th>lifetime &lt;1-24&gt;</th>
<th>Optional. Sets the lifetime of cached entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>{max-entries &lt;10-1024&gt;}</td>
<td>• &lt;1-24&gt; – Specify the lifetime period from 1 - 24 hours (default is 1 hour)</td>
</tr>
<tr>
<td></td>
<td>• max-entries – Optional. Configures the maximum number of entries in the cache</td>
</tr>
<tr>
<td></td>
<td>• &lt;10-1024&gt; – Sets the maximum number of entries in the cache from 10 - 1024 (default is 128 entries)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>max-entries &lt;10-1024&gt;</th>
<th>Optional. Configures the maximum number of entries in the cache</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;10-1024&gt; – Sets the maximum number of entries in the cache from 10 - 1024 (default is 128 entries)</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-radius-server-policy-test)#session-resumption lifetime 10 max-entries 11
```

```
rfs7000-37FABE(config-radius-server-policy-test)#show context
radius-server-policy test
proxy retry-delay 8
proxy retry-count 4
proxy realm test1 server 172.16.10.17 port 1025 secret 0 test1123
ldap-server primary host 172.16.10.19 port 162 login "test" bind-dn "bind-dn1" base-dn "bas-dn1" passwd 0 test@123 passwd-attr test123 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
session-resumption lifetime 10 max-entries 11
rfs7000-37FABE(config-radius-server-policy-test)#
```

Related Commands

```
no
```

Disables session resumption on this RADIUS server policy
16.2.13 termination

> radius-server-policy

Enables EAP termination on this RADIUS server policy. When enabled, EAP authentication is terminated at the controller level. This option is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

termination

Parameters

None

Examples

```bash
nx9500-6C8809(config-radius-server-policy-test)#termination

nx9500-6C8809(config-radius-server-policy-test)#show context radius-server-policy test
termination
no bypass crl-check
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables EAP termination on this RADIUS server policy</td>
</tr>
</tbody>
</table>
16.2.14 use

> radius-server-policy

Defines settings used with the RADIUS server policy

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
use [radius-group <RAD-GROUP-NAME1> {RAD-GROUP-NAME2} | radius-user-pool-policy <RAD-USER-POOL-NAME>]

Parameters
- use [radius-group <RAD-GROUP-NAME1> {RAD-GROUP-NAME2} | radius-user-pool-policy <RAD-USER-POOL-NAME>]

| radius-group <RAD-GROUP-NAME1> {RAD-GROUP-NAME2} | Associates a specified RADIUS group (for LDAP users) with this RADIUS server policy. You can optionally associate two RADIUS groups with one RADIUS server policy. |
| radius-user-pool-policy <RAD-USER-POOL-NAME> | Associates a specified RADIUS user pool with this RADIUS server policy. Specify a user pool name. |

Examples
rfs7000-37FABE(config-radius-server-policy-test)#use radius-group test
rfs7000-37FABE(config-radius-server-policy-test)#show context
radius-server-policy test
proxy retry-delay 8
proxy retry-count 4
proxy realm test1 server 172.16.10.7 port 1025 secret 0 test1123
ldap-server primary host 172.16.10.19 port 162 login "test" bind-dn "bind-dn1" base-dn "bas-dn1" passwd 0 test@123 passwd-attr test123 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
use radius-group test
session-resumption lifetime 10 max-entries 11
rfs7000-37FABE(config-radius-server-policy-test)#

Related Commands
no Disassociates a RADIUS group or a RADIUS user pool policy from this RADIUS server policy
16.3 radius-user-pool-policy

`RADIUS-POLICY`

Configures a RADIUS user pool policy and enters its configuration mode

A user pool defines policies for individual user access to the internal RADIUS resources. User pool policies define unique permissions (either temporary or permanent) that control user access to the local RADIUS resources. A pool can contain a single user or multiple users.

Use the (config) instance to configure RADIUS user pool policy commands. To navigate to the radius-user-pool-policy instance, use the following commands:

```
<DEVICE>(config)#radius-user-pool-policy <POOL-NAME>
```

```
rfs7000-37FABE(config)#radius-user-pool-policy testuser
rfs7000-37FABE(config-radius-user-pool-testuser)#
```

```
rfs7000-37FABE(config-radius-user-pool-testuser)#?
Radius User Pool Mode commands:
duration Set a guest user's access duration
no Negate a command or set its defaults
user Radius user configuration
clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal
```

```
rfs7000-37FABE(config-radius-user-pool-testuser)#
```

The following table summarizes RADIUS user pool policy configuration commands:

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>duration</code></td>
<td>Modifies a guest user's duration of captive-portal access</td>
<td>page 16-35</td>
</tr>
<tr>
<td><code>user</code></td>
<td>Configures the RADIUS user parameters</td>
<td>page 16-36</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negates a command or sets its default</td>
<td>page 16-39</td>
</tr>
</tbody>
</table>
### 16.3.1 duration

**radius-user-pool-policy**

Modifies the duration, in minutes, that a guest user can access the captive portal

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

duration <GUEST-USER-NAME> <0-525600>

**Parameters**
- duration <GUEST-USER-NAME> <0-525600>

<table>
<thead>
<tr>
<th>duration &lt;GUEST-USER-NAME&gt; &lt;0-525600&gt;</th>
<th>Modifies the duration of captive-portal access (in minutes) for the guest user identified by the &lt;GUEST-USER-NAME&gt; keyword</th>
</tr>
</thead>
<tbody>
<tr>
<td>- &lt;GUEST-USER-NAME&gt;</td>
<td>- Specify the guest user’s name.</td>
</tr>
<tr>
<td>- &lt;0-525600&gt;</td>
<td>- Specify the access duration from 0 - 525600 minutes. A value of “0” indicates unlimited access. The default is 1440 minutes.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-radius-user-pool-wdws)#show context radius-user-pool-policy wdws
  user guestuser1 password 0 guestuser@1 group wdws guest expiry-time 12:30 expiry-date 12/15/2014 access-duration 500
rfs4000-229D58(config-radius-user-pool-wdws)#

rfs4000-229D58(config-radius-user-pool-wdws)#duration guestuser1 200
rfs4000-229D58(config-radius-user-pool-wdws)#show context radius-user-pool-policy wdws
  user guestuser1 password 0 guestuser@1 group wdws guest expiry-time 12:30 expiry-date 12/15/2014 access-duration 200
rfs4000-229D58(config-radius-user-pool-wdws)#
```
16.3.2 user

- radius-user-pool-policy

Configures RADIUS user parameters

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
user <USERNAME> password [0 <UNENCRYPTED-PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]
{group <RAD-GROUP-NAME>} {guest}

user <USERNAME> password [0 <UNENCRYPTED-PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]
{group <RAD-GROUP-NAME>} {guest expiry-time <HH:MM> expiry-date <MM/DD/YYYY>
{access-duration <0-525600>|data-limit|email-id <EMAIL-ID>|start-time <HH:MM>
start-date <MM/DD/YYY>|telephone <TELEPHONE-NUMBER>}}

user <USERNAME> password [0 <UNENCRYPTED-PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]
{group <RAD-GROUP-NAME>} {guest expiry-time <HH:MM> expiry-date <MM/DD/YYYY>
{access-duration <0-525600>|data-limit <1-102400> committed-downlink <100-1000000>
committed-uplink <100-1000000> reduced-downlink <100-1000000> reduced-uplink
<100-1000000>|email-id <EMAIL-ID>|start-time <HH:MM> start-date <MM/DD/YYYY>
{telephone <TELEPHONE-NUMBER>}}}
```

Parameters

- user <USERNAME> password [0 <UNENCRYPTED-PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]
{group <RAD-GROUP-NAME>} {guest expiry-time <HH:MM> expiry-date <MM/DD/YYYY>
{access-duration <0-525600>|data-limit <1-102400> committed-downlink <100-1000000>
committed-uplink <100-1000000> reduced-downlink <100-1000000> reduced-uplink
<100-1000000>|email-id <EMAIL-ID>|start-time <HH:MM> start-date <MM/DD/YYYY>
{telephone <TELEPHONE-NUMBER>}}}

- user <USERNAME> Adds a new RADIUS user to the RADIUS user pool
  - <USERNAME> – Specify the name of the user. The username should not exceed 64 characters.
  - Note: The username is a unique alphanumeric string identifying this user, and cannot be modified with the rest of the configuration.

- passwd
  - [0 <UNENCRYPTED-PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]
  - Configures the user password (provide a password unique to this user)
  - 0 <UNENCRYPTED-PASSWORD> – Sets an unencrypted password
  - 2 <ENCRYPTED-PASSWORD> – Sets an encrypted password
  - <PASSWORD> – Sets a password (specified unencrypted) up to 21 characters

- group <RAD-GROUP-NAME>
  - Optional. Configures the RADIUS server group of which this user is a member
  - <RAD-GROUP-NAME> – Specify the group name in the local database.
  - Note: If the user is a guest, assign the user a group with temporary access privileges.

- guest
  - Optional. Specifies that this user is a guest user. Guest users have restricted access.
  - After enabling a guest user account, specify the expiry time and date for this account.
  - Note: A guest user can be assigned only to a guest user group.

- expiry-time <HH:MM>
  - Specify the user account expiry time in the HH:MM format (for example, 12:30 means 30 minutes after 12:00 the user login will expire).
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expiry-date <MM:DD:YYYY>

Specify the user account expiry date in the MM:DD:YYYY format (for example. 02:15:2014).

{access-duration <0-525600>|data-limit <1-102400>
committed-downlink <100-1000000>
committed-uplink <100-1000000>
reduced-downlink <100-1000000>
reduced-uplink <100-1000000>
email-id <EMAIL-ID>
start-time <HH:MM>
start-date <MM:DD:YYY>
telephone <TELEPHONE-NUMBER>}

After configuring the above user details, optionally configure the following user information:
- access-duration <0-525600> – Configures the duration, in minutes, for which this guest user can access the captive portal.
- data-limit <1-102400> – Configures the data limit for which this guest user can access the captive portal. Specify a value from 1 - 102400 bytes.
- committed-downlink <100-1000000> – Configures committed downlink bandwidth until data limit is reached. This value represents the download speed (in kilobits per second) allocated to the guest user. When bandwidth is available, the user can download data at the specified rate. If a guest user has a bandwidth based policy and exceeds the specified data limit, the speed is throttled to the reduced downlink rate (specified using this command). Specify a value from 100 - 1000000 Kbps.
- committed-uplink <100-1000000> – Configures committed uplink bandwidth until data limit is reached. This value represents the upload speed (in kilobits per second) allocated to the guest user. When bandwidth is available, the user can upload data at the specified rate. If a guest user has a bandwidth based policy and exceeds the specified data limit, the speed is throttled to the reduced uplink rate (specified using this command). Specify a value from 100 - 1000000 Kbps.
- reduced-downlink <100-1000000> – Configures reduced downlink bandwidth after data limit is reached. This value represents the reduced speed the guest utilizes (in kilobits per second) when exceeding the specified data limit, if applicable. If a guest user has a bandwidth based policy and exceeds the specified data limit, the speed is throttled to the reduced downlink rate specified here. Specify a value from 100 - 1000000 Kbps.
- reduced-uplink <100-1000000> – Configures reduced uplink bandwidth after data limit is reached. This value represents the reduced speed the guest utilizes (in kilobits per second) when exceeding the specified data limit, if applicable. If a guest user has a bandwidth based policy and exceeds the specified data limit, the speed is throttled to the reduced uplink rate specified here. Specify a value from 100 - 1000000 Kbps.
- email-id – Optional. User’s e-mail ID
- start-time – Optional. User’s account activation time. After specifying the activation time, specify the activation date.
- start-date – User’s account activation date
- telephone – Optional. User’s telephone number (should include the area code)

Note: To view access details of guest users on a RADIUS server, in the Priv Executable Configuration mode, use the following command:

show > radius > guest-users

rfs7000-37FABE#show radius guest-users time
TIME (min:sec) USED REMAINING GUEST USER
0:00 500:00 user1
Current time: 09:03:07
rfs7000-37FABE#
Examples
rfs4000-229D58(config-radius-user-pool-wdws)#user guestuser1 password 0 guestuser@1
group wdws guest expiry-time 12:30 expiry-date 12/15/2014 access-duration 500
rfs4000-229D58(config-radius-user-pool-wdws)#
rfs4000-229D58(config-radius-user-pool-wdws)#show context
radius-user-pool-policy wdws
  user guestuser1 password 0 guestuser@1 group wdws guest expiry-time 12:30 expiry-date
  12/15/2014 access-duration 500
rfs4000-229D58(config-radius-user-pool-wdws)#
nx4500-5CFA2B(config-radius-user-pool-pool1)#user word password 0 word group group1
  guest expiry-time 11:10 expiry-date 12/12/2014 data-limit 10 committed-downlink 103
  committed-uplink 100 reduced-downlink 102 reduced-uplink 101
nx4500-5CFA2B(config-radius-user-pool-pool1)#

Related Commands

| no | Deletes a user from a RADIUS user pool |
16.3.3 no

Negates a command or sets its default. When used in the RADIUS user pool policy mode, the no command deletes a user from a RADIUS user pool.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```plaintext
no user <USERNAME>
```

Parameters

- no user <USERNAME>

Examples

The following example shows the RADIUS user pool 'wdws' settings before the 'no' command is executed:

```plaintext
rfs4000-229D58(config-radius-user-pool-wdws)#show context
radius-user-pool-policy wdws
user guestuser1 password 0 guestuser@1 group wdws guest expiry-time 12:30 expiry-date 12/15/2014 access-duration 500
```

```plaintext
rfs4000-229D58(config-radius-user-pool-wdws) no user guestuser1
```

The following example shows the RADIUS user pool 'wdws' settings after the 'no' command is executed:

```plaintext
rfs4000-229D58(config-radius-user-pool-wdws)#show context
radius-user-pool-policy wdws
```

```
Related Commands
```

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user</td>
<td>Configures the RADIUS user parameters</td>
</tr>
</tbody>
</table>
This chapter summarizes the radio QoS policy in the CLI command structure.

Configuring and implementing a radio QoS policy is essential for WLANs with heavy traffic and less bandwidth. The policy enables you to provide preferential service to selected network traffic by controlling bandwidth allocation. The radio QoS policy can be applied to VLANs configured on an access point. In case no VLANs are configured, the radio QoS policy can be applied to an access point’s Ethernet and radio ports.

Without a dedicated QoS policy, a network operates on a best-effort delivery basis, meaning all traffic has equal priority and an equal chance of being delivered in a timely manner. When congestion occurs, all traffic has an equal chance of being dropped!

When configuring a QoS policy for a radio, select specific network traffic, prioritize it, and use congestion-management and congestion-avoidance techniques to provide deployment customizations best suited to each QoS policy’s intended wireless client base.

A well-designed QoS policy should:

- Classify and mark data traffic to accurately prioritize and segregate it (by access category) throughout the network.
- Minimize network delay and jitter for latency sensitive traffic.
- Ensure higher priority traffic has a better likelihood of delivery in the event of network congestion.
- Prevent ineffective utilization of access points degrading session quality by configuring admission control mechanisms within each radio QoS policy.

Within a managed wireless network, wireless clients supporting low and high priority traffic contend with one another for access and data resources. The IEEE 802.11e amendment has defined Enhanced Distributed Channel Access (EDCA) mechanisms stating high priority traffic can access the network sooner than lower priority traffic. The EDCA defines four traffic classes (or access categories); voice (highest), video (next highest), best effort, and background (lowest). The EDCA has defined a time interval for each traffic class, known as the Transmit Opportunity (TXOP). The TXOP prevents traffic of a higher priority from completely dominating the wireless medium, thus ensuring lower priority traffic is still supported.

IEEE 802.11e includes an advanced power saving technique called Unscheduled Automatic Power Save Delivery (U-APSD) that provides a mechanism for wireless clients to retrieve packets buffered by an access point. U-APSD reduces the amount of signaling frames sent from a client to retrieve buffered data from an access point. U-APSD also allows access points to deliver buffered data frames as bursts, without backing-off between data frames. These improvements are useful for voice clients, as they provide improved battery life and call quality.

The Wi-Fi alliance has created Wireless Multimedia (WMM) and WMM Power Save (WMM-PS) certification programs to ensure interoperability between 802.11e WLAN infrastructure implementations and wireless clients. A managed wireless network supports both WMM and WMM-Power Save techniques. WMM and WMM-PS (U-APSD) are enabled by default in each WLAN profile.
Enabling WMM support on a WLAN just advertises the WLAN's WMM capability and radio configuration to wireless clients. The wireless clients must also support WMM and use the values correctly while accessing the WLAN to benefit.

WMM includes advanced parameters (CWMin, CWMax, AIFSN and TXOP) specifying back-off duration and inter-frame spacing when accessing the network. These parameters are relevant to both connected access point radios and their wireless clients. Parameters impacting access point transmissions to their clients are controlled using per radio WMM settings, while parameters used by wireless clients are controlled by a WLAN's WMM settings.

Wireless network controllers (access points, controllers, and service platforms) include a Session Initiation Protocol (SIP), Skinny Call Control Protocol (SCCP) and Application Layer Gateway (ALG) enabling devices to identify voice streams and dynamically set voice call bandwidth.

Wireless network controllers also support static QoS mechanisms per WLAN to provide prioritization of WLAN traffic when legacy (non WMM) clients are deployed. When enabled on a WLAN, traffic forwarded to a client is prioritized and forwarded based on the WLAN's WMM access control setting.

Wireless network administrators can also assign weights to each WLAN in relation to user priority levels. The lower the weight, the lower the priority. Use a weighted technique to achieve different QoS levels across WLANs.

All devices rate-limit bandwidth for WLAN sessions. This form of per-user rate limiting enables administrators to define uplink and downlink bandwidth limits for users and clients. This sets the level of traffic a user or client can forward and receive over the WLAN. If the user or client exceeds the limit, excessive traffic is dropped.

Rate limits can be applied to WLANs using groups defined locally or externally from a RADIUS server using Vendor Specific Attributes (VSAs). Rate limits can be applied to users authenticating using 802.1X, captive portal authentication, and devices using MAC authentication.

Use the (config) instance to configure radios QoS policy related configuration commands. To navigate to the radio QoS policy instance, use the following commands:

```bash
<rfs7000-37FABE>(config)#radio-qos-policy <POLICY-NAME>
```

Radio QoS Mode commands:

- `accelerated-multicast` Configure multicast streams for acceleration
- `admission-control` Configure admission-control on this radio for one or more access categories
- `no` Negate a command or set its defaults
- `smart-aggregation` Configure smart aggregation parameters
- `wmm` Configure 802.11e/Wireless MultiMedia parameters
- `clrscrb` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```bash
<rfs7000-37FABE>(config-radio-qos-test)#
```
NOTE: The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
17.1 radio-qos-policy

The following table summarizes radio QoS policy configuration commands:

Table 17.1 Radio-QoS-Policy-Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>accelerated-multicast</td>
<td>Configures multicast streams for acceleration</td>
<td>page 17-5</td>
</tr>
<tr>
<td>admission-control</td>
<td>Enables admission control across all radios for one or more access categories</td>
<td>page 17-6</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or resets configured settings to their default</td>
<td>page 17-9</td>
</tr>
<tr>
<td>smart-aggregation</td>
<td>Configures smart aggregation parameters</td>
<td>page 17-11</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands in the radio QoS configuration mode</td>
<td>page 17-13</td>
</tr>
<tr>
<td>wmm</td>
<td>Configures 802.11e/wireless multimedia parameters</td>
<td>page 17-14</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
17.1.1 accelerated-multicast

Configures multicast streams for acceleration. Multicasting allows group transmission of data streams.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

accelerated-multicast [client-timeout | max-client-streams | max-streams | overflow-policy | stream-threshold]

Examples

rfs7000-37FABE(config-radio-qos-test)#accelerated-multicast client-timeout 500
rfs7000-37FABE(config-radio-qos-test)#accelerated-multicast stream-threshold 15

Related Commands

no

Reverts accelerated multicasting settings to their default
### 17.1.2 admission-control

**radio-qos-policy**

Enables admission control across all radios for one or more access categories. Enabling admission control for an access category, ensures clients associated to an access point and complete WMM admission control before using that access category.

Supported in the following platforms:
- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

| admission-control [background|best-effort|firewall-detected-traffic|implicit-tspec|video|voice] |
| admission-control [firewall-detected-traffic|implicit-tspec] |
| admission-control [background|best-effort|video|voice] {max-airtime-percent|max-clients|max-roamed-clients|reserved-for-roam-percent} |
| admission-control [background|best-effort|video|voice] {max-airtime-percent <0-150>|max-clients <0-256>|max-roamed-clients <0-256>|reserved-for-roam-percent <0-150>} |

#### Parameters

- **admission-control [firewall-detected-traffic|implicit-tspec]**

| admission-control firewall-detected-traffic | Enforces admission control for traffic whose access category is detected by the firewall ALG. For example, SIP voice calls. This feature is enabled by default. When enabled, the firewall simulates reception of frames for voice traffic when the voice traffic was originated via SIP or SCCP control traffic. If a client exceeds configured values, the call is stopped and/or received voice frames are forwarded at the priority of the next non admission controlled traffic class priority. This applies to clients that do not send TSPEC frames only. |
| admission-control implicit-tspec | Enables implicit traffic specifiers for clients that do not support WMM TSPEC, but are accessing admission-controlled access categories. This feature is enabled by default. This feature requires wireless clients to send their traffic specifications to an access point before they can transmit or receive data. If enabled, this setting applies to this radio QoS policy. When enabled, the access point simulates the reception of frames for any traffic class by looking at the amount of traffic the client is receiving and sending. If the client sends more traffic than has been configured for an admission controlled traffic class, the traffic is forwarded at the priority of the next non admission controlled traffic class. This applies to clients that do not send TSPEC frames only. |

- **admission-control [background|best-effort|video|voice] {max-airtime-percent <0-150>|max-clients <0-256>|max-roamed-clients <0-256>|reserved-for-roam-percent <0-150>}**

<p>| admission-control background | Configures background access category admission control parameters |
| admission-control best-effort | Configures best effort access category admission control parameters |
| admission-control video | Configures video access category admission control parameters |</p>
<table>
<thead>
<tr>
<th>admission-control voice</th>
<th>Configures voice access category admission control parameters</th>
</tr>
</thead>
</table>
| max-airtime-percent <0-150> | Optional. Specifies the maximum percentage of airtime, including oversubscription, for the following access category:  
|                           | • background – Sets the maximum airtime (in the form of a percentage of the radio’s bandwidth) allotted to admission control for low (background) client traffic. Background traffic only needs a short radio airtime to process, so set an intermediate airtime value if this radio QoS policy is reserved to support background data.  
|                           | • best-effort – Sets the maximum airtime (in the form of a percentage of the radio’s bandwidth) allotted to admission control for normal (best-effort) client traffic. Normal best effort traffic needs a short radio airtime to process, so set an intermediate airtime value if this radio QoS policy is reserved for best effort data support.  
|                           | • video – Sets the maximum airtime (in the form of a percentage of the radio’s bandwidth) allotted to admission control for voice supported client traffic. Video traffic requires longer radio airtime to process, so set a longer airtime value if this radio QoS policy is intended to support video.  
|                           | • voice – Sets the maximum airtime (in the form of a percentage of the radio’s bandwidth) allotted to admission control for voice supported client traffic. Voice traffic requires longer radio airtime to process, so set a longer airtime value if this radio QoS policy is intended to support voice.  
|                           | The following keyword is common to all of the above traffic types:  
|                           | • <0-150> – Specify a value from 0 - 150. This is the maximum percentage of airtime, including oversubscription, for the selected access category. The default is 75%. |
| max-clients <0-256> | Optional. Specifies the maximum number of wireless clients admitted to the following access categories:  
|                           | • background – Sets the number of wireless clients supporting low (background) traffic allowed to exist (and consume bandwidth) within the radio’s QoS policy  
|                           | • best-effort – Sets the number of wireless clients supporting normal (best-effort) traffic allowed to exist (and consume bandwidth) within the radio’s QoS policy  
|                           | • video – Sets the number of video supported wireless clients allowed to exist (and consume bandwidth) within the radio’s QoS policy  
|                           | • voice – Sets the number of voice supported wireless clients allowed to exist (and consume bandwidth) within the radio’s QoS policy.  
|                           | **Note**: Since voice and video supported wireless clients use a greater portion of a controller’s resources than lower bandwidth traffic (like low and best effort categories), consider setting the max-client value proportionally to the number of other QoS policies supporting voice access category clients.  
|                           | The following keyword is common to all of the above traffic types:  
|                           | • <0-256> – Specify a value from 0 - 256. This is the maximum number of wireless clients admitted to the selected access category. The default is 100 clients. |
### max-roamed-clients <0-256>
Optional. Specifies the maximum number of roaming wireless clients admitted to the selected access category.
- **background** – Sets the number of low (background) supported wireless clients allowed to roam to a different access point radio.
- **best-effort** – Sets the number of normal (best-effort) supported wireless clients allowed to roam to a different access point radio.
- **video** – Sets the number of video supported wireless clients allowed to roam to a different access point radio.
- **voice** – Sets the number of voice supported wireless clients allowed to roam to a different access point radio.

The following keyword is common to all of the above traffic types:
- **<0-256>** – Specify a value from 0 - 256. This is the maximum number of roaming wireless clients admitted to the selected access category. The default is 10 roamed clients.

### reserved-for-roam-percent <0-150>
Optional. Calculates the percentage of air time, including oversubscription, allocated exclusively for roaming clients. This value is calculated relative to the configured max air time for this access category.
- **background** – Sets the roam utilization (in the form of a percentage of the radio's bandwidth) allotted to admission control for low (background) supported clients who have roamed to a different radio.
- **best-effort** – Sets the roam utilization (in the form of a percentage of the radio's bandwidth) allotted to admission control for normal (best-effort) supported clients who have roamed to a different radio.
- **video** – Sets the roam utilization (in the form of a percentage of the radio's bandwidth) allotted to admission control for video supported clients who have roamed to a different radio.
- **voice** – Sets the roam utilization (in the form of a percentage of the radio's bandwidth) allotted to admission control for voice supported clients who have roamed to a different radio.

The following keyword is common to all of the above traffic types:
- **<0-150>** – Specify a value from 0 - 150. This is the percentage of air time, including oversubscription, allocated exclusively for roaming clients associated with the selected access category. The default is 10%.

### Examples
```
rfs7000-37FABE(config-radio-qos-test)#admission-control best-effort max-clients 200
rfs7000-37FABE(config-radio-qos-test)#admission-control voice reserved-for-roam-percent 8
rfs7000-37FABE(config-radio-qos-test)#admission-control voice max-airtime-percent 9
rfs7000-37FABE(config-radio-qos-test)#show context radio-qos-policy test
  admission-control voice max-airtime-percent 9
  admission-control voice reserved-for-roam-percent 8
  admission-control best-effort max-clients 200
  accelerated-multicast stream-threshold 15
  accelerated-multicast client-timeout 500
rfs7000-37FABE(config-radio-qos-test)#
```

### Related Commands
- **no** Reverts or resets admission control settings to their default
17.1.3 no

Negates a command or resets configured settings to their default. When used in the radio QOS policy mode, the no command enables the resetting of accelerated multicast parameters, admission control parameters, and MultiMedia parameters.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [accelerated-multicast|admission-control|smart-aggregation|wmm|service]

no accelerated-multicast [client-timeout|max-client-streams|max-streams|
overflow-policy|stream-threshold]

no admission-control [firewall-detected-traffic|implicit-tspec|background|
best-effort|video|voice]

no admission-control [firewall-detected-traffic|implicit-tspec]

no admission-control [background|best-effort|video|voice] {max-airtime-percent|
max-clients|max-roamed-clients|reserved-for-roam-percent}

no smart-aggregation {delay|max-mesh-hops|min-aggregation-limit}

no smart-aggregation {delay [background|best-effort|streaming-video|
video-conferencing|voice] | max-mesh-hops | min-aggregation-limit}

no wmm [background|best-effort|video|voice] [aifsn|cw-max|cw-min|txop-limit]

no service admission-control across-reassoc

Parameters

- no <PARAMETERS>

Examples

The following example shows the Radio-qos-policy 'test' settings before the 'no' commands are executed:

```
rfs7000-37FABE(config-radio-qos-test)#show context
radio-qos-policy test
admission-control voice max-airtime-percent 9
admission-control voice reserved-for-roam-percent 8
admission-control best-effort max-clients 200
accelerated-multicast stream-threshold 15
accelerated-multicast client-timeout 500
```

```
rfs7000-37FABE(config-radio-qos-test)#no admission-control best-effort max-clients
rfs7000-37FABE(config-radio-qos-test)#no accelerated-multicast client-timeout
```
The following example shows the Radio-qos-policy 'test' settings after the 'no' commands are executed:

```text
rfs7000-37FABE(config-radio-qos-test)#show context
radio-qos-policy test
    admission-control voice max-airtime-percent 9
    admission-control voice reserved-for-roam-percent 8
    accelerated-multicast stream-threshold 15
rfs7000-37FABE(config-radio-qos-test)#

rfs4000-229D58(config-radio-qos-test)#show context
radio-qos-policy test
    service admission-control across-reassoc
rfs4000-229D58(config-radio-qos-test)#

rfs4000-229D58(config-radio-qos-test)#no service admission-control across-reassoc
rfs4000-229D58(config-radio-qos-test)#show context
radio-qos-policy test
rfs4000-229D58(config-radio-qos-test)#
```
17.1.4 smart-aggregation

Configures smart aggregation parameters on this Radio QoS policy. Smart aggregation is disabled by default.

Smart aggregation enhances frame aggregation by dynamically selecting the time when the aggregated frame is transmitted. In a frame’s typical aggregation, an aggregated frame is sent when:

- A pre-configured number of aggregated frames is reached
- An administrator-defined interval has elapsed since the first frame (of a set of frames to be aggregated) was received
- An administrator-defined interval has elapsed since the last frame (not necessarily the final frame) of a set of frames to be aggregated was received

With this enhancement, an aggregation delay is set uniquely for each traffic class. For example, voice traffic might not be aggregated, but sent immediately. Whereas, background data traffic is set a delay for aggregating frames, and these aggregated frames are sent.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
smart-aggregation {delay|max-mesh-hops|min-aggregation-limit}

Parameters
- **smart-aggregation {delay [background|best-effort|streaming-video|video-conferencing|voice] <0-1000>}
- **smart-aggregation {max-mesh-hops <1-10>}
- **smart-aggregation {min-aggregation-limit <0-64>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>delay</td>
<td>Optional. Configures the maximum delay parameter for each traffic type</td>
</tr>
<tr>
<td></td>
<td>This is the maximum delay, in milliseconds, in the transmission of the first frame received.</td>
</tr>
<tr>
<td>background</td>
<td>Configures the maximum delay parameter, in milliseconds, for background traffic (250 msec)</td>
</tr>
<tr>
<td>best-effort</td>
<td>Configures the maximum delay parameter, in milliseconds, for best effort traffic (150 msec)</td>
</tr>
<tr>
<td>streaming-video</td>
<td>Configures the maximum delay parameter, in milliseconds, for streaming video traffic (150 msec)</td>
</tr>
<tr>
<td>video-conferencing</td>
<td>Configures the maximum delay parameter, in milliseconds, for video conference traffic (40 msec)</td>
</tr>
<tr>
<td>voice</td>
<td>Configures the maximum delay parameter, in milliseconds, for voice traffic (0 msec)</td>
</tr>
<tr>
<td>&lt;0-1000&gt;</td>
<td>This parameter is common to all of the above traffic types.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-1000&gt; – Specify a value from 0 - 1000 msec.</td>
</tr>
</tbody>
</table>
### smart-aggregation \{max-mesh-hops <1-10>\}

<table>
<thead>
<tr>
<th>max-mesh-hops &lt;1-10&gt;</th>
<th>Optional. Sets the maximum number of expected hops to the destination within a mesh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;1-10&gt; – Specify a value from 1 - 10. The default is 3 hops.</td>
</tr>
</tbody>
</table>

### smart-aggregation \{min-aggregation-limit <0-64>\}

<table>
<thead>
<tr>
<th>min-aggregation-limit &lt;0-64&gt;</th>
<th>Optional. Sets the minimum number of aggregates buffered before an aggregate is sent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;0-64&gt; – Specify a value from 0 - 64. The default is 8 frames.</td>
</tr>
</tbody>
</table>

### Examples

```plaintext
rfs7000-37FABE(config-radio-qos-test)#smart-aggregation delay voice 50
rfs7000-37FABE(config-radio-qos-test)#smart-aggregation delay background 100
rfs7000-37FABE(config-radio-qos-test)#show context radio-qos-policy test
  smart-aggregation delay voice 50
  smart-aggregation delay background 100
rfs7000-37FABE(config-radio-qos-test)#
```

### Related Commands

<table>
<thead>
<tr>
<th>no</th>
<th>Resets the minimum aggregation limit</th>
</tr>
</thead>
</table>

```
17.1.5 service

Invokes service commands in the radio QoS configuration mode

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

service [admission-control|show]
service admission-control across-reassoc
service show cli

Parameters
- service admission-control across-reassoc

Examples

rfs4000-229D58(config-radio-qos-test)#service admission-control across-reassoc

Related Commands

no Disables retention of previously negotiated TSPEC parameters across re-associations on the radio
17.1.6 **wmm**

Configures 802.11e *wireless multimedia* (wmm) parameters

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
wmm [background|best-effort|video|voice] [aifsn <1-15>|cw-max <0-15>|cw-min <0-15>|txop-limit <0-65535>]
```

**Parameters**

- **wmm [background|best-effort|video|voice]**
  - **aifsn <1-15>:** Configures *Arbitrary Inter-Frame Space Number* (AIFSN) as the wait time between data frames derived from the AIFSN and slot time
    - **background:** Sets the current AIFSN for low (background) traffic. The default is 7.
    - **best-effort:** Sets the current AIFSN for normal (best-effort) traffic. The default is 3.
    - **video:** Sets the current AIFSN for video traffic. Higher-priority traffic video categories should have lower AIFSNs than lower-priority traffic categories. This causes lower-priority traffic to wait longer before attempting access. The default is 1.
    - **voice:** Sets the current AIFSN for voice traffic. Higher-priority traffic voice categories should have lower AIFSNs than lower-priority traffic categories. This causes lower-priority traffic to wait longer before attempting access. The default is 1.

The following keyword is common to all of the above traffic types:
- **<1-15>:** Sets a value from 1 - 15

- **cw-max <0-15>:** Clients pick a number between 0 and the min contention window to wait before retransmission. Clients then double their wait time on a collision, until it reaches the maximum contention window.
  - **background:** Sets CW Max for low (background) traffic. The default is 10.
  - **best-effort:** Sets CW Max for normal (best effort) traffic. The default is 6.
  - **voice:** Sets CW Max for voice traffic. The default is 3.
  - **video:** Sets CW Max for video traffic. The default is 4

Contd..
The following keyword is common to all of the above traffic types:

- `<0-15>` – ECW: the contention window. The actual value used is \(2^{\text{ECW}} - 1\).

**Note:** Lower values are used for higher priority traffic (like video and voice) and higher values are used for lower priority traffic (like background and best-effort).

### cw-min `<0-15>`

Clients select a number between 0 and the min contention window to wait before retransmission. Clients then double their wait time on a collision, until it reaches the maximum contention window.

- **background** – Sets CW Min for low (background) traffic. The default is 4.
- **best-effort** – Sets CW Min for normal (best effort) traffic. The default is 4.
- **voice** – Sets CW Min for voice traffic. The default is 2.
- **video** – Sets CW Min for video traffic. The default is 3.

**The following keyword is common to all of the above traffic types:**

- `<0-15>` – ECW: the contention window. The actual value used is \(2^{\text{ECW}} - 1\).

**Note:** Lower values are used for higher priority traffic (like video and voice) and higher values are used for lower priority traffic (like background and best-effort).

### txop-limit `<0-65535>`

Set the interval, in microseconds, during which a particular client has the right to initiate transmissions.

- **background** – Sets TXOP for low (background) traffic. The default is 0.
- **best-effort** – Sets TXOP for normal (best effort) traffic. The default is 4.
- **voice** – Sets TXOP for voice traffic. The default is 47.
- **video** – Sets TXOP for video traffic. The default is 94.

**The following keyword is common to all of the above traffic types:**

- `<0-65535>` – Specify a value from 0 - 65535 to configure the transmit opportunity limit in 32 microsecond units.

**Note:** Lower values are used for higher priority traffic (like video and voice) and higher values are used for lower priority traffic (like background and best-effort).

### Usage Guidelines

Before defining a radio QoS policy, refer to the following deployment guidelines to ensure the configuration is optimally effective:

- To support QoS, each multimedia application, wireless client, and WLAN is required to support WMM.
- WMM enabled clients can co-exist with non-WMM clients on the same WLAN. Non-WMM clients are always assigned a Best Effort access category.
- Default WMM values are recommended for all deployments. Changing these values can lead to unexpected traffic blockages, and the blockages might be difficult to diagnose.
- Overloading an access point radio with too much high priority traffic (especially voice) degrades overall service quality for all users.
- TSPEC admission control is only available with newer voice over WLAN phones. Many legacy voice devices do not support TSPEC or even support WMM traffic prioritization.
Examples

```
rf7000-37FABE(config-radio-qos-test)#wmm best-effort aifsn 7
rf7000-37FABE(config-radio-qos-test)#wmm voice txop-limit 1

rf7000-37FABE(config-radio-qos-test)#show context
radio-qos-policy test
  wmm best-effort aifsn 7
  wmm voice txop-limit 1
  admission-control voice max-airtime-percent 9
  admission-control voice reserved-for-roam-percent 8
  accelerated-multicast stream-threshold 15
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Reverts or resets 802.11e/wireless multimedia settings to their default</td>
</tr>
</tbody>
</table>
This chapter summarizes the role policy commands in the CLI command structure.

A well defined role policy simplifies user management, and is a significant aspect of WLAN management. It acts as a role based firewall (much like ACLs) consisting of user-defined roles. Each role has a set of match criteria (filters) used to filter wireless clients. The action taken when a client matches the defined filters, is determined by the IP or MAC ACL associated with the user-defined role. Based on the conditions specified in the IP and/or MAC ACL, clients are granted or denied access to the controller managed network. The role policy also defines the VLAN and data rates assigned to clients provided network access.

A role policy also enables LDAP service, allowing controllers and access points to retrieve user information from the LDAP server. This information is matched with the user-defined role filters to determine if a client matches the role or not, and should be allowed or denied access to the controller managed network.

Use the (config-role-policy) instance to configure role policy related configuration commands. To navigate to the config-role instance, use the following commands:

```
<DEVICE>(config)#role-policy <POLICY-NAME>
```

```
rfs7000-37FABE(config)#role-policy test
rfs7000-37FABE(config-role-policy-test)#?
```

Role Policy Mode commands:
- `default-role` Configuration for Wireless Clients not matching any role
- `ldap-deadperiod` Ldap dead period interval
- `ldap-query` Set the ldap query mode
- `ldap-server` Add a ldap server
- `ldap-timeout` Ldap query timeout interval
- `no` Negate a command or set its defaults
- `user-role` Create a role
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
rfs7000-37FABE(config-role-policy-test)#
```

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
18.1 role-policy

The following table summarizes role policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>default-role</td>
<td>Assigns the default role to clients not matching any of the user-defined</td>
<td>page 18-3</td>
</tr>
<tr>
<td></td>
<td>roles defined in the role policy</td>
<td></td>
</tr>
<tr>
<td>ldap-deadperiod</td>
<td>Configures the Lightweight Directory Access Protocol (LDAP) deadperiod</td>
<td>page 18-5</td>
</tr>
<tr>
<td></td>
<td>interval</td>
<td></td>
</tr>
<tr>
<td>ldap-query</td>
<td>Enables LDAP service and specifies the LDAP server query mode</td>
<td>page 18-6</td>
</tr>
<tr>
<td>ldap-server</td>
<td>Configures the LDAP server settings</td>
<td>page 18-7</td>
</tr>
<tr>
<td>ldap-timeout</td>
<td>Configures the LDAP query timeout interval</td>
<td>page 18-9</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 18-10</td>
</tr>
<tr>
<td>user-role</td>
<td>Creates a role and associates it to the newly created role policy</td>
<td>page 18-11</td>
</tr>
</tbody>
</table>

NOTE: For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
18.1.1 default-role

Assigns a default role to a wireless client that fails to match any of the user-defined roles. When a wireless client accesses a network, the client’s details, retrieved from the LDAP server, are matched against all user-defined roles within the role policy. If the client fails to match any of these user-defined role filters, the client is assigned the default role. The action taken (permit or deny access) is determined by the IP and/or MAC ACL associated with the default role.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

default-role use [ip-access-list|ipv6-access-list|mac-access-list] [in|out] <IP/IPv6/MAC-ACCESS-LIST-NAME> precedence <1-100>

Parameters

- default-role use [ip-access-list|ipv6-access-list|mac-access-list] [in|out] <IP/IPv6/MAC-ACCESS-LIST-NAME> precedence <1-100>

<table>
<thead>
<tr>
<th>default-role use</th>
<th>Enables default role configuration. This role is applied to a wireless client not matching any of the user-defined roles.</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ip-access-list]</td>
<td>Associates an IP access list, IPv6 access list, or a MAC access list with this default role</td>
</tr>
<tr>
<td>ipv6-access-list</td>
<td>[in</td>
</tr>
<tr>
<td>mac-access-list</td>
<td>out – Applies the rule (IP, IPv6, or MAC) to outgoing packets</td>
</tr>
</tbody>
</table>

**Note:** IP and MAC access control lists (ACLs) act as firewalls by blocking and/or permitting data traffic in both directions (inbound and outbound) within a managed network. IP ACLs use IP addresses for matching operations. Whereas, MAC ACLs use MAC addresses for matching operations. In case of a match (i.e. if a packet is received from or is destined for a specified IP or MAC address), an action is taken. This action is a typical allow, deny or mark designation to controller packet traffic. For more information on ACLs, see ACCESS-LIST.

- <IP/IPv6/MAC-ACCESS-LIST-NAME> – Specify the access list name.

**Note:** The ACL applied determines the action applied to a client assigned the default role.

<table>
<thead>
<tr>
<th>precedence &lt;1-100&gt;</th>
<th>The following keyword is common to the all of the above parameters:</th>
</tr>
</thead>
<tbody>
<tr>
<td>precedence</td>
<td>precedence – Assigns a precedence value to the ACL identified in the previous step.</td>
</tr>
<tr>
<td>&lt;1-100&gt;</td>
<td>– Specify a precedence from 1 - 100.</td>
</tr>
</tbody>
</table>

**Note:** ACLs are applied in increasing order of their precedence. Rules with lower precedence are given priority.
Examples

rfs7000-37FABE(config-role-policy-test)#default-role use ip-access-list in test precedence 1
rfs7000-37FABE(config-role-policy-test)#show context role-policy test
default-role use ip-access-list in test precedence 1
rfs7000-37FABE(config-role-policy-test)#

Related Commands

| no                | Removes or resets the default role configuration |
18.1.2 ldap-deadperiod

role-policy

Configures the LDAP deadperiod interval

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ldap-deadperiod <60-300>

Parameters

• ldap-deadperiod <60-300>

<table>
<thead>
<tr>
<th>ldap-deadperiod &lt;60-300&gt;</th>
<th>Configures a LDAP dead period. When enabled, LDAP service allows the AP or controller to bind with the LDAP server and retrieve user details to match with user-defined role filters. The LDAP deadperiod is the interval between two consecutive attempts to bind with the LDAP server. To enable LDAP service, use the ldap-query command.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60-300&gt;</td>
<td>&lt;60-300&gt; – Specify the interval from 60 - 300 seconds. The default is 120 seconds.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-role-policy-test)#ldap-deadperiod 100
rfs7000-37FABE(config-role-policy-test)#show context
role-policy test
default-role use ip-access-list in test precedence 1
ldap-deadperiod 100
rfs7000-37FABE(config-role-policy-test)#

Related Commands

no | Removes or resets the LDAP deadperiod interval
18.1.3 ldap-query

Enables LDAP service and specifies the LDAP server query mode.

Configuring the LDAP server query mode automatically enables LDAP service on this role policy. By default LDAP service is disabled.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
ldap-query [self|through-controller]

Parameters
- ldap-query [self|through-controller]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>self</td>
<td>Configures LDAP query mode as self. The AP directly queries the LDAP server for user information. Select ‘self’ to use local LDAP server resources configured using the <code>ldap-server</code> command.</td>
</tr>
<tr>
<td>through-controller</td>
<td>Configures LDAP query mode as through-controller. The AP queries the LDAP server, for user information, through the controller. <strong>Note:</strong> Use this option when the AP is layer 2 adopted to the controller.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-role-policy-test)#ldap-query self

rfs7000-37FABE(config-role-policy-test)#show context role-policy test
  default-role use ip-access-list in test precedence 1
  ldap-query self
  ldap-deadperiod 100
rfs7000-37FABE(config-role-policy-test)#

Related Commands
- no Disables LDAP service on this role policy
### 18.1.4 ldap-server

Associates a specified LDAP server with this role policy. Use this command to configure the credentials needed to bind with the LDAP server.

When enabled, LDAP service allows the AP or controller to bind with the LDAP server and retrieve user details. This information is matched with the user-defined roles within the role policy. If a match is made, the user is assigned the role and allowed or denied access to the controller managed network.

You can associate two LDAP servers with a role policy, allowing failover in case the primary server is unreachable.

Supported platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
ldap-server <1-2> host [<IP>|<FQDN>] bind-dn <BIND-DN> base-dn <BASE-DN>
bind-password <PASSWORD> [port <1-65535>] {server-type [active-directory|openldap]}
```

**Parameters**

- `ldap-server <1-2>`: Specify the LDAP server ID from 1 - 2. 
  **Note:** The primary LDAP server (ID 1) is used to bind and query. The secondary LDAP server (ID 2) is used for failover.
- `host [<IP>|<FQDN>]`: Specify the LDAP server’s IP address or *Fully Qualified Domain Name* (FQDN).
- `bind-dn <BIND-DN>`: Specify the bind distinguished name (used for binding with the server).
- `base-dn <BASE-DN>`: Specify the base distinguished name (used for searching). This should not exceed 127 characters.
- `bind-password <PASSWORD>`: Specify the LDAP server password associated with the bind DN.
- `port <1-65535>`: Optional. Specify the LDAP server port from 1 - 65535. (default is 389).
- `server-type [active-directory|openldap]`:
  The following keywords are common to the ‘port’ parameter:
  - `server-type`: Optional. Specifies the LDAP server type
  - `active-directory`: Enables support for active directory attribute search. This is the default setting.
  - `openldap`: Enables support for openLDAP attribute search

**Usage Guidelines**

Use the ldap-query command to enable LDAP service on a role policy.

Use the `show > role > ldap-stats` command to view LDAP server status and state.
Examples

rfs7000-37FABE(config-role-policy-test)#ldap-server 1 host 192.168.13.7 bind-dn "CN=Administrator,CN=Users,DC=TechPub,DC=com" base-dn "CN=Administrator,CN=Users,DC=TechPub,DC=com" bind-password 0 superuser port 2
rfs7000-37FABE(config-role-policy-test)#

rfs7000-37FABE(config-role-policy-test)#show context
role-policy test
  default-role use ip-access-list in test precedence 1
  ldap-query self
  ldap-deadperiod 100
  ldap-server 1 host 192.168.13.7 bind-dn CN=Administrator,CN=Users,DC=TechPub,DC=com
    base-dn CN=Administrator,CN=Users,DC=com bind-password 0 superuser port 2
rfs7000-37FABE(config-role-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes or resets the LDAP server settings</td>
</tr>
</tbody>
</table>
### 18.1.5 ldap-timeout

Configures the LDAP timeout interval. This is the interval after which a LDAP query is timed out.

**Supported in the following platforms:**
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`ldap-timeout <1-5>`

**Parameters**

- `ldap-timeout <1-5>`

<table>
<thead>
<tr>
<th>ldap-timeout &lt;1-5&gt;</th>
<th>Configures the LDAP query timeout interval from 1 - 5 seconds (default is 2 seconds) When enabled, LDAP service allows the AP or controller to bind with the LDAP server and query it for user details. The LDAP query timeout is the interval between a request to and the response from the LDAP server. Once this interval is exceeded, the LDAP bind and query is timed out.</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config-role-policy-test)#ldap-timeout 1

rfs7000-37FABE(config-role-policy-test)#show context
role-policy test default-role use ip-access-list in test precedence 1
ldap-query self
ldap-timeout 1
ldap-deadperiod 100
ldap-server 1 host 192.168.13.7 bind-dn CN=Adminstrator,CN=Users,DC=TechPub,DC=com base-dn CN=Administrator,CN=Users,DC=com bind-password 0 superuser port 2
rfs7000-37FABE(config-role-policy-test)#
```

**Related Commands**

- `no` Removes or resets the LDAP query timeout to default (2 seconds)
18.1.6 no

Negates a command or resets settings to their default. When used in the config role policy mode, the no command removes or resets the role policy settings.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [default-role|ldap-deadperiod|ldap-query|ldap-server <1-2>|ldap-timeout|user-role]

no [ldap-deadperiod|ldap-query|ldap-server <1-2>|ldap-timeout]

no default-role use [ip-access-list|ipv6-access-list|mac-access-list]
no default-role use [ip-access-list|ipv6-access-list|mac-access-list] [in|out]
  <IP/IPv6/MAC-ACCESS-LIST-NAME> precedence <1-100>

no user-role <ROLE-NAME>

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Negates a command or resets settings to their default. When used in the config role policy mode, the no command removes or resets the role policy settings. |

Examples

The following example shows the role policy ‘test’ setting before the ‘no’ commands are executed:

rfs7000-37FABE(config-role-policy-test)#show context
role-policy test
default-role use ip-access-list in test precedence 1
ldap-query self
ldap-timeout 1
ldap-deadperiod 100
ldap-server 1 host 192.168.13.7 bind-dn CN=Administrator,CN=Users,DC=TechPub,DC=com
base-dn CN=Administrator,CN=Users,DC=com bind-password 0 superuser port 2

rfs7000-37FABE(config-role-policy-test)#

rfs7000-37FABE(config-role-policy-test)#no ldap-deadperiod
rfs7000-37FABE(config-role-policy-test)#no ldap-timeout
rfs7000-37FABE(config-role-policy-test)#no ldap-server 1

The following example shows the role policy ‘test’ setting after the ‘no’ commands are executed:

rfs7000-37FABE(config-role-policy-test)#show context
role-policy test
default-role use ip-access-list in test precedence 1
ldap-query self
rfs7000-37FABE(config-role-policy-test)#
18.1.7 user-role

This command creates a user-defined role. Each user-defined role has a set of Active Directory attributes. Each attribute is matched against the information returned by the LDAP server, until a complete match of role is found.

The following table summarizes user role configuration commands:

<table>
<thead>
<tr>
<th>Table 18.2</th>
<th>User-Role-Config Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>user-role</td>
<td>Creates a new user role and enters its configuration mode</td>
</tr>
<tr>
<td>user-role commands</td>
<td>Summarizes user role configuration mode commands</td>
</tr>
</tbody>
</table>
18.1.7.1 user-role

user-role

Creates a user-defined role. Each role consists of a set of filters and action. The filters are match criteria used to filter wireless clients. And the action defines the action taken when a client matches the specified filters.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
user-role <ROLE-NAME> precedence <1-10000>

Parameters
- user-role <ROLE-NAME> precedence <1-10000>

<table>
<thead>
<tr>
<th>user-role &lt;ROLE-NAME&gt;</th>
<th>Configures the user role name</th>
</tr>
</thead>
<tbody>
<tr>
<td>precedence &lt;1-10000&gt;</td>
<td>Sets the precedence for this role</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Lower the precedence, higher is the role priority. Precedence determines the order in which a role is applied. If a wireless client matches multiple roles, the role with the lower precedence is applied before those with higher precedence. While there is no default precedence for a role, two or more roles can share the same precedence.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-role-policy-test)#user-role testing precedence 10
rfs7000-37FABE(config-role-policy-test)#show context role-policy test
  user-role testing precedence 10
  default-role use ip-access-list in test precedence 1
rfs7000-37FABE(config-role-policy-test)#

rfs7000-37FABE(config-role-policy-test-user-role-testing)#?

Role Mode commands:
- ap-location AP Location configuration
- assign Assign parameters to the role
- authentication-type Type of Authentication
- captive-portal Captive-portal based Role Filter
- city City configuration
- client-identity Client identity
- company Company configuration
- country Country configuration
- department Department configuration
- emailid Emailid configuration
- employee-type Employee-type configuration
- employeeid Employeeid configuration
- encryption-type Type of encryption
- group Group configuration
- memberOf MemberOf configuration
- mu-mac MU MAC address configuration
- no Negate a command or set its defaults
- radius-user Radius-user configuration
- ssid SSID configuration
- state State configuration
- title Title configuration
- use Set setting to use
- user-defined User-defined configuration
- clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

rfs7000-37FABE(config-role-policy-test-user-role-testing)#

Related Commands

| no | Removes an existing user role |
18.1.7.2 user-role commands

The following table summarizes user role configuration mode commands:

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap-location</td>
<td>Configures an AP deployment location based filter</td>
<td>page 18-15</td>
</tr>
<tr>
<td>assign</td>
<td>Configures upstream/downstream rate limits and VLAN ID assigned to clients matching the filters defined in the user-defined role</td>
<td>page 18-16</td>
</tr>
<tr>
<td>authentication-type</td>
<td>Configures an authentication type based filter</td>
<td>page 18-18</td>
</tr>
<tr>
<td>captive-portal</td>
<td>Configures a captive portal based filter</td>
<td>page 18-19</td>
</tr>
<tr>
<td>city</td>
<td>Configures a city name based filter</td>
<td>page 18-20</td>
</tr>
<tr>
<td>client-identity</td>
<td>Associates a client-identity (device fingerprinting) based filter</td>
<td>page 18-21</td>
</tr>
<tr>
<td>company</td>
<td>Configures a company name based filter</td>
<td>page 18-22</td>
</tr>
<tr>
<td>country</td>
<td>Configures a country name based filter</td>
<td>page 18-23</td>
</tr>
<tr>
<td>department</td>
<td>Configures a department name based filter</td>
<td>page 18-24</td>
</tr>
<tr>
<td>emailid</td>
<td>Configures a e-mail ID based filter</td>
<td>page 18-26</td>
</tr>
<tr>
<td>employee-type</td>
<td>Configures a employee type ID based filter</td>
<td>page 18-28</td>
</tr>
<tr>
<td>employeeid</td>
<td>Configures a employee ID based filter</td>
<td>page 18-29</td>
</tr>
<tr>
<td>encryption-type</td>
<td>Configures an encryption type filter</td>
<td>page 18-31</td>
</tr>
<tr>
<td>group</td>
<td>Configures a RADIUS group based filter</td>
<td>page 18-33</td>
</tr>
<tr>
<td>memberOf</td>
<td>Assigns an Active Directory (AD) group to this user-defined role</td>
<td>page 18-35</td>
</tr>
<tr>
<td>mu-mac</td>
<td>Configures MAC address and mask based filter</td>
<td>page 18-36</td>
</tr>
<tr>
<td>no</td>
<td>Removes or resets the filters configured on this user-defined role</td>
<td>page 18-37</td>
</tr>
<tr>
<td>radius-user</td>
<td>Configures a wireless client filter based on the RADIUS user name</td>
<td>page 18-39</td>
</tr>
<tr>
<td>ssid</td>
<td>Configures a SSID based filter</td>
<td>page 18-41</td>
</tr>
<tr>
<td>state</td>
<td>Configures a user role state to match</td>
<td>page 18-42</td>
</tr>
<tr>
<td>title</td>
<td>Configures a ‘title’ string to match</td>
<td>page 18-43</td>
</tr>
<tr>
<td>use</td>
<td>Associates a IP and/or MAC ACL with this role. These ACLs specify the action taken when a client matches this user-defined role.</td>
<td>page 18-46</td>
</tr>
<tr>
<td>user-defined</td>
<td>Defines a filter based on an attribute defined in the Active Directory or the OpenLDAP server</td>
<td>page 18-49</td>
</tr>
</tbody>
</table>
18.1.7.2.1 ap-location

- **user-role commands**

Configures an AP’s deployment location based filter for this user-defined role.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ap-location [any|contains|exact|not-contains]
```

```
ap-location any
```

```
ap-location [contains|exact|not-contains] <WORD>
```

**Parameters**

- **ap-location any**

  | ap-location any | Specifies the AP location to match (in a RF Domain) or the AP’s resident configuration.
  |                | • any – Defines an AP’s location as any.

- **ap-location [contains|exact|not-contains] <WORD>**

  | ap-location | Specifies the AP location to match (in a RF Domain) or the AP’s resident configuration.
  | contains <WORD> | Applies role if the associating AP’s location contains the location string specified in the role.
  | • <WORD> – Specify the location string to match.
  | exact <WORD> | Applies role if the associating AP’s location exactly matches the string specified in the role.
  | • <WORD> – Specify the exact location string to match.
  | not-contains <WORD> | Applies role if the associating AP’s location does not contain the location string specified in the role.
  | • <WORD> – Specify the location string not to match.

**Examples**

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#ap-location contains office
```

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context user-role-testing precedence 10
  ap-location contains office
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```

**Related Commands**

- **no** Removes an AP’s deployment location string from this user-defined role.
18.1.7.2.2 assign

Configure upstream/downstream rate limits and VLAN ID. Clients matching this user-defined role filters are associated with the specified VLAN, and assigned the specified data rates.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

assign [rate-limit | VLAN]

assign rate-limit [from-client | to-client] <1-65536>
assign vlan <1-4094>

Parameters

- assign rate-limit [from-client | to-client] <1-65536>
  Assigns an upstream and downstream traffic rate limit
  - from-client — Assigns a rate limit, in Kbps, for the upstream (from client) traffic
  - to-client — Assigns a rate limit, in Kbps, for the downstream (to client) traffic
  - <1-65536> — Specify upstream and/or downstream rate limits from 1 - 65536 Kbps.
  **Note:** Wireless clients matching this user-defined role are assigned the configured rate limits.

- assign vlan <1-4094>
  Assigns a VLAN (identified by VLAN’s ID). Clients matching this user-defined role are associated with the specified VLAN. The VLAN ID represents the shared SSID each user employs to interoperate within the network (once authenticated by the local RADIUS server). This feature is disabled by default.
  - <1-4094> — Specify the VLAN ID from 1 - 4094.
  **Note:** A wireless client that fails to match any user-defined role is assigned to the default role (configured as a role policy setting) and is mapped to the default VLAN under the WLAN.

Usage Guidelines

ACLs can only be used with tunnel or isolated-tunnel modes. They do not work with the local and automatic modes.

In case of bridge VLAN, the default bridging mode is ‘auto’. Change the bridging mode to ‘tunnel’. This extends the controller’s existing VLAN onto the AP and ensures that wireless clients are served IP addresses.

The VLAN configured under the user-defined role need not exist under the WLAN. But, when using tunneled VLAN bridges, configure an additional bridge VLAN. If the VLAN bridging mode is ‘local’, no additional VLAN configuration is required.
Examples
rfs4000-229D58 (config-role-policy-test-user-role-test)#assign rate-limit to-client 200
rfs4000-229D58 (config-role-policy-test-user-role-test)#commit
rfs4000-229D58 (config-role-policy-test-user-role-test)#show context
user-role test precedence 1
assign vlan 1
assign rate-limit to-client 200
rfs4000-229D58 (config-role-policy-test-user-role-test)#

The following examples define a role used to forward the IP traffic from all engineers in Test_Company, Santa Clara, USA onto VLAN 2.

1. Create a new role policy with name ‘test-policy’.
   <DEVICE>(config)#role-policy test-policy

2. Specify the LDAP server used for this role policy.
   <DEVICE>(config-role-policy-test-policy)#ldap-query self
   <DEVICE>(config-role-policy-test-policy)#ldap-server 1 host 192.160.1.1 bind-dn CN=Administrator,CN=Users,DC=testtest,DC=com base-dn CN=Administrator,CN=Users,DC=com bind-password 0 test port 389
   <DEVICE>(config-role-policy-test-policy)#ldap-timeout 2

3. Create a user defined role.
   <DEVICE>(config-role-policy-test-policy)#user-role SCEngineer precedence 100

4. Define the role by adding appropriate values and match operators.
   <DEVICE>(config-role-policy-test-policy-user-role-SCEngineer)#city exact santa-clara
   <DEVICE>(config-role-policy-test-policy-user-role-SCEngineer)#company exact ExampleCompany
   <DEVICE>(config-role-policy-test-policy-user-role-SCEngineer)#country exact usa
   <DEVICE>(config-role-policy-test-policy-user-role-SCEngineer)#title contains engineer
   <DEVICE>(config-role-policy-test-policy-user-role-SCEngineer)#assign vlan-id 2

5. Apply role policy to an access point.
   ap7131-99BFA8(config-device-ap7131)# use role-policy test-policy

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the upstream and/or downstream rate limits applied to this user-defined role. Also removes the VLAN ID.</td>
</tr>
</tbody>
</table>
18.1.7.2.3 authentication-type

*user-role commands*

Configures the authentication type based filter for this user-defined role

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
authentication-type [any|eq|neq]
authentication-type any
authentication-type [eq|neq] [eap|kerberos|mac-auth|none] 
{(eap|kerberos|mac-auth|none)}
```

**Parameters**

- `authentication-type any`  
  The authentication type is any (eq or neq). This is the default setting.

- `authentication-type [eq|neq] [eap|kerberos|mac-auth|none] 
{(eap|kerberos|mac-auth|none)}`  
  The role is applied only when the authentication type matches (equals) one or more than one of the following types:
  - eap – Extensible authentication protocol
  - kerberos – Kerberos authentication
  - mac-auth – MAC authentication protocol
  - none – no authentication used
  These parameters are recursive, and you can configure more than one unique authentication type for this user-defined role.

- `authentication-type [eq|neq] [eap|kerberos|mac-auth|none] 
{(eap|kerberos|mac-auth|none)}`  
  The role is applied only when the authentication type does not match (not equals) any of the following types:
  - eap – Extensible authentication protocol
  - kerberos – Kerberos authentication
  - mac-auth – MAC authentication protocol
  - none – no authentication used
  These parameters are recursive, and you can configure more than one unique ‘not equal to’ authentication type for this user-defined role.

**Examples**

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#authentication-type eq kerberos
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  ap-location contains office
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```

**Related Commands**

```
no
```

Removes the authentication type filter configured for this user-defined role
18.7.2.4 captive-portal

user-role commands

Configures a captive portal based filter for this user-defined role. A captive portal is a guest access policy that provides temporary and restrictive access to the wireless network. When applied to a WLAN, a captive portal policy ensures secure guest access.

This command defines user-defined role filters based on a wireless client’s state of authentication.

Supported in the following platforms:
• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

captive-portal authentication-state [any|post-login|pre-login]

Parameters
• captive-portal authentication-state [any|post-login|pre-login]

<table>
<thead>
<tr>
<th>authentication-state</th>
<th>Defines the authentication state of a client connecting to a captive portal</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>Specifies any authentication state (authenticated and pending authentication). This is the default setting. This option makes no distinction on whether authentication is conducted before or after the wireless client has logged in.</td>
</tr>
<tr>
<td>post-login</td>
<td>Specifies authentication is completed successfully This option requires the wireless client to share authentication credentials after logging into the managed network.</td>
</tr>
<tr>
<td>pre-login</td>
<td>Specifies authentication is pending This option enables captive portal client authentication before the client is logged into the controller.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-role-policy-test-user-role-testing)#captive-portal authentication-state pre-login
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  ap-location contains office
  captive-portal authentication-state pre-login
rfs7000-37FABE(config-role-policy-test-user-role-testing)#

Related Commands

no | Removes the captive portal based role filter settings
18.1.7.2.5 city

user-role commands

Configures a wireless client filter based on the city name

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

city [any|contains|exact|not-contains]
city [any|exact <WORD>|contains <WORD>|not-contains <WORD>]

Parameters

- city [any|exact <WORD>|contains <WORD>|not-contains <WORD>]

<table>
<thead>
<tr>
<th>city</th>
<th>Specifies a wireless client filter based on how the 'city' name, returned by the RADIUS server, matches the provided expression. Select one of the following options: any, contains, exact, or not-contain.</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>No specific city associated with this user-defined role. This role can be applied to any wireless client from any city.</td>
</tr>
<tr>
<td>contains</td>
<td>The role is applied only when the city name, returned by the RADIUS server, contains the string specified in the role.</td>
</tr>
<tr>
<td>&lt;WORD&gt;</td>
<td>- &lt;WORD&gt; – Specify the string to match (this is case sensitive, and is compared against the city name returned by the RADIUS server). It should contain the provided expression.</td>
</tr>
<tr>
<td>exact</td>
<td>The role is applied only when the city name, returned by the RADIUS server, exactly matches the string specified in the role.</td>
</tr>
<tr>
<td>&lt;WORD&gt;</td>
<td>- &lt;WORD&gt; – Specify the exact string to match (this is case sensitive, and is compared against the city name returned by the RADIUS server). It should be an exact match.</td>
</tr>
<tr>
<td>not-contains</td>
<td>The role is applied only when the city name, returned by the RADIUS server, does not contain the string specified in the role.</td>
</tr>
<tr>
<td>&lt;WORD&gt;</td>
<td>- &lt;WORD&gt; – Specify the string not to match (this is case sensitive, and is compared against the city name returned by the RADIUS server). It should not contain the provided expression.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-role-policy-test-user-role-testing)#city exact SanJose

rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  ap-location contains office
  captive-portal authentication-state pre-login
  city exact SanJose
rfs7000-37FABE(config-role-policy-test-user-role-testing)#

Related Commands

no | Removes the city name configured with this user-defined role
18.1.7.2.6 client-identity

- **user-role commands**

  Associates a client-identity (device fingerprinting) based filter. The role is assigned to a wireless client matching any of the defined client identities.

  For more information on configuring client identity fingerprints, see [client-identity](#).

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
client-identity <CLIENT-IDENTITY-NAME> {<CLIENT-IDENTITY-NAME>}
```

**Parameters**

- **client-identity <CLIENT-IDENTITY-NAME> {<CLIENT-IDENTITY-NAME>}**

<table>
<thead>
<tr>
<th>client-identity &lt;CLIENT-IDENTITY-NAME&gt;</th>
<th>Specifies the client-identity fingerprint to match (should be existing and configured)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;CLIENT-IDENTITY-NAME&gt;</td>
<td>— Specify the client identity signature name.</td>
</tr>
</tbody>
</table>

**Note:** Multiple client identities can be configured with a role policy.

**Usage Guidelines**

When associating a single or multiple client identities with a role policy, ensure that in a client identity group, all the client identities used by the role policy, is attached to the device or profile using the role policy. In other words, group all the client identities (used in this role policy) in a client identity group, and associate this group to the profile or device using this role policy.

For more information on configuring client identities and client identity groups, see [client-identity](#), and [client-identity-group](#).

For more information on associating a client identity group and a role policy to a profile or a device, see [use](#).

**Examples**

```
rfs4000-229D58 (config-role-policy-test-user-role-test)#client-identity TestClientIdentity
rfs4000-229D58 (config-role-policy-test-user-role-test)#commit

rfs4000-229D58 (config-role-policy-test-user-role-test)#client-identity ClientIdentityWindows
rfs4000-229D58 (config-role-policy-test-user-role-test)#

rfs4000-229D58 (config-role-policy-test-user-role-test)#show context
  user-role test precedence 1
    client-identity TestClientIdentity
    client-identity ClientIdentityWindows
rfs4000-229D58 (config-role-policy-test-user-role-test)#
```

**Related Commands**

| no | Removes the client identities associated with this role policy |
18.1.7.2.7 company

user-role commands

Configures a wireless client filter based on the company name

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

company [any|contains|exact|not-contains]
company [any|exact <WORD>|contains <WORD>|not-contains <WORD>]

Parameters
- company [any|exact <WORD>|contains <WORD>|not-contains <WORD>]

<table>
<thead>
<tr>
<th>company</th>
<th>Specifies a wireless client filter based on how the 'company' name, returned by the RADIUS server, matches the provided expression. Select one of the following options: any, contains, exact, or not-contains</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>No specific company associated with this user-defined role. This role is applied to any wireless client from any company (no strings to match). This is the default setting.</td>
</tr>
</tbody>
</table>
| contains <WORD> | The role is applied only when the company name, returned by the RADIUS server, contains the string specified in the role.  
  - <WORD> – Specify the string to match (this is case sensitive, and is compared against the company name returned by the RADIUS server). It should contain the provided expression. |
| exact | The role is applied only when the company name, returned by the RADIUS server, exactly matches the string specified in the role.  
  - <WORD> – Specify the exact string to match (this is case sensitive, and is compared against the company name returned by the RADIUS server). It should be an exact match. |
| not-contains <WORD> | The role is applied only when the company name, returned by the RADIUS server, does not contain the string specified in the role.  
  - <WORD> – Specify the string not to match (this is case sensitive, and is compared against the company name returned by the RADIUS server). It should not contain the provided expression. |

Examples

rfs7000-37FABE(config-role-policy-test-user-role-testing)#company exact ExampleCompany

rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  ap-location contains office
  captive-portal authentication-state pre-login
  city exact SanJose
  company exact ExampleCompany

rfs7000-37FABE(config-role-policy-test-user-role-testing)#

Related Commands

no | Removes the company name configured with this user-defined role |
### 18.1.7.2.8 country

#### user-role commands

Configures a wireless client filter based on the country name

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
country [any|contains|exact|not-contains]
country [any|exact <WORD>|contains <WORD>|not-contains <WORD>]
```

#### Parameters

- `country [any|exact <WORD>|contains <WORD>|not-contains <WORD>]`

<table>
<thead>
<tr>
<th>country</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>No specific country associated with this user-defined role. This role is applied to any wireless client from any country (no strings to match). This is the default setting.</td>
</tr>
<tr>
<td>contains &lt;WORD&gt;</td>
<td>The role is applied only when the country name, returned by the RADIUS server, contains the string specified in the role.</td>
</tr>
<tr>
<td>exact</td>
<td>The role is applied only when the country name, returned by the RADIUS server, exactly matches the string specified in the role.</td>
</tr>
<tr>
<td>not-contains &lt;WORD&gt;</td>
<td>The role is applied only when the country name, returned by the RADIUS server, does not contain the string specified in the role.</td>
</tr>
</tbody>
</table>

#### Examples

```plaintext
rfs7000-37FABE(config-role-policy-test-user-role-testing)#country exact America
```

```plaintext
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  ap-location contains office
  captive-portal authentication-state pre-login
  city exact SanJose
  company exact Examplecompany
  country exact America
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```

#### Related Commands

- `no` Removes the country name configured with this user-defined role
### 18.1.7.2.9 department

*user-role commands*

Configures a wireless client filter based on the department name

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
department [any|contains|exact|not-contains] department [any|exact <WORD>|contains <WORD>|not-contains <WORD>]
```

#### Parameters

- `department [any|exact <WORD>|contains <WORD>|not-contains <WORD>]`

<table>
<thead>
<tr>
<th>department</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>No specific department associated with this user-defined role. This role can be applied to any wireless client from any department (no strings to match). This is the default setting.</td>
</tr>
<tr>
<td>contains &lt;WORD&gt;</td>
<td>The role is applied only when the department name, returned by the RADIUS server, contains the string specified in the role.</td>
</tr>
<tr>
<td>exact</td>
<td>The role is applied only when the department name, returned by the RADIUS server, exactly matches the string specified in the role.</td>
</tr>
<tr>
<td>not-contains &lt;WORD&gt;</td>
<td>The role is applied only when the department name, returned by the RADIUS server, does not contain the string specified in the role.</td>
</tr>
</tbody>
</table>

#### Examples

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#department exact TnV
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  ap-location contains office
  captive-portal authentication-state pre-login
  city exact SanJose
  company exact ExampleCompany
  country exact America
  department exact TnV
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```
## Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the department name configured with this user-defined role</td>
</tr>
</tbody>
</table>
18.1.7.2.10 emailid

**user-role commands**

Configures a wireless client filter based on the e-mail ID

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

emailid [any|contains|exact|not-contains]
emailid [any|exact <WORD>|contains <WORD>|not-contains <WORD>]

**Parameters**

- emailid [any|exact <WORD>|contains <WORD>|not-contains <WORD>]

<table>
<thead>
<tr>
<th>emailid</th>
<th>Specifies a wireless client filter based on how the 'e-mail ID', returned by the RADIUS server, matches the provided expression. Select one of the following options: any, contains, exact, or not-contains</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>No specific e-mail ID associated with this user-defined role. This role can be applied to any wireless client having any e-mail ID (no strings to match). This is the default setting.</td>
</tr>
</tbody>
</table>
| contains <WORD>  | The role is applied only when the e-mail ID, returned by the RADIUS server, contains the string specified in the role.  
                  | • <WORD> – Specify the string to match (this is case sensitive, and is compared against the e-mail ID returned by the RADIUS server). It should contain the provided expression. |
| exact            | The role is applied only when the e-mail ID, returned by the RADIUS server, exactly matches the string specified in the role.  
                  | • <WORD> – Specify the exact string to match (this is case sensitive, and is compared against the e-mail ID returned by the RADIUS server). It should be an exact match. |
| not-contains <WORD> | The role is applied only when the e-mail ID, returned by the RADIUS server, does not contain the string specified in the role.  
                      | • <WORD> – Specify the string not to match (this is case sensitive, and is compared against the e-mail ID returned by the RADIUS server). It should not contain the provided expression. |

**Examples**

rfs7000-37FABE(config-role-policy-test-user-role-testing)#emailid exact testing@examplecompany.com

rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  ap-location contains office
  captive-portal authentication-state pre-login
  city exact SanJose
  company exact ExampleCompany
  country exact America
  department exact TnV
emailid exact testing@examplecompany.com
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
## Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the e-mail ID configured with this user-defined role</td>
</tr>
</tbody>
</table>
18.1.7.2.11 employee-type

**user-role commands**

Configures a wireless client filter based on the employee type

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
employee-type [any|contains|exact|not-contains]
employee-type [any|exact <WORD>|contains <WORD>|not-contains <WORD>]
```

**Parameters**

- `employee-type [any|contains|exact|not-contains]`
  - Specifies a wireless client filter based on how the 'employee type', returned by the RADIUS server, matches the provided expression. Select one of the following options: any, contains, exact, or not-contains.
  
- `any`
  - No specific employee type associated with this user-defined role. This role can be applied to any wireless client having any employee type (no strings to match). This is the default setting.
  
- `contains <WORD>`
  - The role is applied only when the employee type, returned by the RADIUS server, contains the string specified in the role.
  
- `exact`
  - The role is applied only when the employee type, returned by the RADIUS server, exactly matches the string specified in the role.
  
- `not-contains <WORD>`
  - The role is applied only when the employee type, returned by the RADIUS server, does not contain the string specified in the role.

**Examples**

```
rfs4000-229D58(config-role-policy-test-user-role-test1)#employee-type exact consultant
rfs4000-229D58(config-role-policy-test-user-role-user1)#show context user-role user1 precedence 1
employee-type exact consultant
rfs4000-229D58(config-role-policy-test-user-role-user1)#
```

**Related Commands**

- `no`
  - Removes the employee type filter configured with this user-defined role
18.1.7.2.12 employeeid

user-role commands

Configures a wireless client filter based on the employee ID

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

employeeid [any|contains|exact|not-contains]
employeeid [any|exact <WORD>|contains <WORD>|not-contains <WORD>]

Parameters

- employeeid [any|exact <WORD>|contains <WORD>|not-contains <WORD>]}

<table>
<thead>
<tr>
<th>employeeid</th>
<th>Specifies a wireless client filter based on how the ‘employee ID’, returned by the RADIUS server, matches the provided expression. Select one of the following options: any, contains, exact, or not-contains.</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>No specific employee ID associated with this user-defined role. This role can be applied to any wireless client having any employee ID (no strings to match). This is the default setting.</td>
</tr>
<tr>
<td>contains &lt;WORD&gt;</td>
<td>The role is applied only when the employee ID, returned by the RADIUS server, contains the string specified in the role.</td>
</tr>
<tr>
<td>exact</td>
<td>The role is applied only when the employee ID, returned by the RADIUS server, exactly matches the string specified in the role.</td>
</tr>
<tr>
<td>not-contains &lt;WORD&gt;</td>
<td>The role is applied only when the employee ID, returned by the RADIUS server, does not contain the string specified in the role.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-role-policy-test-user-role-testing)#employeeid contains TnVTest1
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  ap-location contains office
  captive-portal authentication-state pre-login
  city exact SanJose
  company exact ExampleCompany
  country exact America
  department exact TnV
  emailid exact testing@examplecompany.com
  employeeid contains TnVTest1
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the employee ID configured with this user-defined role</td>
</tr>
</tbody>
</table>
18.1.7.2.13 encryption-type

user-role commands

Selects the encryption type for this user-defined role. Encryption ensures privacy between access points and wireless clients. There are various modes of encrypting communication on a WLAN, such as Counter-model CBC-MAC Protocol (CCMP), Wired Equivalent Privacy (WEP), keyguard, Temporal Key Integrity Protocol (TKIP), etc.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
encryption-type [any|eq|neq]

encryption-type any

encryption-type [eq|neq] [ccmp|keyguard|none|tkip|wep128|wep64]
   [(ccmp|keyguard|none|tkip|tkip-ccmp|wep128|wep64)]
```

Parameters

- encryption-type any
  - The encryption type can be any one of the listed options (ccmp|keyguard|tkip|wep128|wep64). This is the default setting.

- encryption-type [eq|neq] [ccmp|keyguard|none|tkip|wep128|wep64]
  - The role is applied only if the encryption type equals to one of the following options:
    - ccmp – Encryption mode is CCMP
    - keyguard – Encryption mode is keyguard. Keyguard encryption shields the master encryption keys from being discovered.
    - none – No encryption mode specified
    - tkip – Encryption mode is TKIP
    - wep128 – Encryption mode is WEP128
    - wep64 – Encryption mode is WEP64
  - These parameters are recursive, and you can configure more than one encryption type for this user-defined role.

- encryption-type [eq|neq] [ccmp|keyguard|none|tkip|wep128|wep64]
  - The role is applied only if encryption type is not equal to any of the following options:
    - ccmp – Encryption mode is not equal to CCMP
    - keyguard – Encryption mode is not equal to keyguard
    - none: Encryption mode is not equal to none
    - tkip – Encryption mode is not equal to TKIP
    - wep128 – Encryption mode is not equal to WEP128
    - wep64 – Encryption mode is not equal to WEP64
  - These parameters are recursive, and you can configure more than one ‘not equal to’ encryption type for this user-defined role.
Examples

rfs7000-37FABE(config-role-policy-test-user-role-testing)#encryption-type eq wep128

rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  encryption-type eq wep128
  ap-location contains office
  captive-portal authentication-state pre-login
  city exact SanJose
  company exact ExampleCompany
  country exact America
  department exact TnV
  emailid exact testing@examplecompany.com
  employeeid contains TnVTest1
rfs7000-37FABE(config-role-policy-test-user-role-testing)#

Related Commands

| no | Removes the encryption type configured for this user-defined role |
18.1.7.2.14 group

user-role commands

Configures a wireless client filter based on the RADIUS group name

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
(group [any|contains|exact|not-contains]
  group [any|contains <WORD>|exact <WORD>|not-contains <WORD>]
```

Parameters

- `group [any|contains <WORD>|exact <WORD>|not-contains <WORD>]`

<table>
<thead>
<tr>
<th>group</th>
<th>Specifies a wireless client filter based on how the RADIUS group name matches the provided expression. Select one of the following options: any, contains, exact, or not-contains</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>This user-defined role can fit into any group (no strings to match). This is the default setting.</td>
</tr>
<tr>
<td>contains &lt;WORD&gt;</td>
<td>The role is applied only when the RADIUS group name contains the string specified in the role.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;WORD&gt;</code> – Specify the string to match (this is case sensitive, and is compared against the group name returned by the RADIUS server). It should contain the provided expression.</td>
</tr>
<tr>
<td>exact &lt;WORD&gt;</td>
<td>The role is applied only when the RADIUS group name exactly matches the string specified in the role.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;WORD&gt;</code> – Specify the exact string to match (this is case sensitive, and is compared against the group name returned by the RADIUS server). It should be an exact match.</td>
</tr>
<tr>
<td>not-contains &lt;WORD&gt;</td>
<td>The role is applied only when the RADIUS group name does not contain the string specified in the role.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;WORD&gt;</code> – Specify the string not to match (this is case sensitive, and is compared against the group name returned by the RADIUS server). It should not contain the provided expression.</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#group contains testgroup

rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  encryption-type eq wep128
  ap-location contains office
  group contains testgroup
  captive-portal authentication-state pre-login
  city exact SanJose
  company exact Example_company
  country exact America
  department exact TnV
  emailid exact testing@examplecompany.com
  employeeid contains TnVTest1
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```
## Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the group configured for this user-defined role</td>
</tr>
</tbody>
</table>
18.1.7.2.15 memberOf

This command applies an Active Directory (AD) group filter to this user-defined role. A wireless client can be a member of more than one group within the AD database. This command applies a AD group based firewall, which applies a role to a wireless client only if it belongs to the specified AD group.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
memberOf <AD-GROUP-NAME>

Parameters
- memberOf <AD-GROUP-NAME>

Examples

```plaintext
rfs4000-229D58(config-role-policy-test-user-role-test)#memberOf ADTestgroup
rfs4000-229D58(config-role-policy-test-user-role-test)#show context
user-role test precedence 1
assign vlan 1
assign rate-limit to-client 200
memberOf ADTestgroup
rfs4000-229D58(config-role-policy-test-user-role-test)#
```

Related Commands

```plaintext
no
```

Removes the AD group assigned to this user-defined role
### 18.1.7.2.16 mu-mac

#### user-role commands

Configures a MAC address and mask based filter for this role policy

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
mu-mac [<MAC>|any]

mu-mac any

mu-mac <MAC> {mask <MAC>}
```

#### Parameters

- `mu-mac any`

  - **any**: Applies role to any wireless client (no MAC address to match). This is the default setting.

- `mu-mac <MAC> {mask <MAC>}`

  - **<MAC>**: Applies role to the wireless client having specified MAC address
    - **<MAC>**: Sets the MAC address in the AA-BB-CC-DD-EE-FF format
  
  - **mask <MAC>**: Optional. After specifying the client’s MAC address, specify the mask in the AA-BB-CC-DD-EE-FF format. The role is applied to the wireless client exactly matching the specified MAC address and MAC mask.

#### Examples

```plaintext
rfs7000-37FABE(config-role-policy-test-user-role-testing)#mu-mac 11-22-33-44-55-66

rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  authentication-type eq kerberos
  encryption-type eq wep128
  ap-location contains office
  mu-mac 11-22-33-44-55-66
  group contains testgroup
  captive-portal authentication-state pre-login
  city exact SanJose
  company exact ExampleCompany
  country exact America
  department exact TnV
  emailid exact testing@examplecompany.com
  employeeid contains TnVTes1

rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```

#### Related Commands

- `no`: Removes the MAC address and mask for this user-defined role
18.1.7.2.17 no

**user-role commands**

Negates a command or resets configured settings to their default. When used in the config role policy user-defined role mode, the **no** command removes or resets settings, such as AP location, authentication type, encryption type, captive portal, etc.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no [ap-location|assign|authentication-type|captive-portal|city|client-identity|
    company|country|department|emailid|employee-type|employeeid|encryption-type|
    group|memberOf|mu-mac|radius-user|ssid|state|title|use|user-defined]
```

```
no captive-portal authentication-state
```

```
no use [application-policy|bonjour-gw-discovery-policy|ip-access-list|
    ipv6-access-list|mac-access-list|url-filter]
```

```
no use [ip-access-list|ipv6-access-list|mac-access-list] [in|out]
    <IP/IPv6/MAC-ACCESS-LIST-NAME> precedence <1-100>
```

```
no use [application-policy|bonjour-gw-discovery-policy|url-filter]
```

**Parameters**

- no <PARAMETERS>

| no <PARAMETERS> | Negates a command or resets configured settings to their default. When used in the config role policy user-defined role mode, the **no** command removes or resets settings, such as AP location, authentication type, encryption type, captive portal, etc. |

**Usage Guidelines**

The **no** command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

**Examples**

The following example shows the Role Policy ‘test’ User Role ‘testing’ configuration before the ‘no’ commands are executed:

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
    authentication-type eq kerberos
    encryption-type eq wep128
    ap-location contains office
    mu-mac 11-22-33-44-55-66
    group contains testgroup
captive-portal authentication-state pre-login
city exact SanJose
country exact ExampleCompany
    company exact ExampleCompany
department exact TnV
    emailid exact testing@examplecompany.com
    employeeid contains TnVTest1
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```
The following example shows the Role Policy 'test' User Role 'testing' configuration after the 'no' commands are executed:

```plaintext
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
    captive-portal authentication-state pre-login
    city exact SanJose
    company exact ExampleCompany
    country exact America
    department exact TnV
    emailid exact testing@examplecompany.com
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```
18.1.7.2.18 radius-user

**user-role commands**

Configures a wireless client filter based on the RADIUS user name

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
radius-user [any|contains|ends-with|exact|not-contains|starts-with]
```

**Parameters**

- `radius-user [any|contains|ends-with|exact|not-contains|starts-with]`
  - `radius-user` Specifies a wireless client filter based on how the 'radius-user' name, returned by the RADIUS server, matches the provided expression. Select one of the following options: any, contains, exact, or not-contains.
  - `any` No specific RADIUS user name associated with this user-defined role. This role can be applied to any wireless client (no strings to match). This is the default setting.
  - `contains <WORD>` The role is applied only when the 'radius-user' name, returned by the RADIUS server, contains the string specified in the role.
    - `<WORD>` – Specify the string to match (this is case sensitive, and is compared against the 'radius-user' name returned by the RADIUS server). It should contain the provided expression.
    - Note: You can use the realm or any sub-string of the user name.
  - `ends-with <WORD>` Enables role assignment on the basis of the wireless client's “department” and/or “group”
    - `<WORD>` – Specify the string (could be department/group code). For example: 1005000002. In this the last three digits represent the department/group code. The remaining digits represent user’s badge number.
    - The role is applied only when the ‘radius-user’ name, returned by the RADIUS server, ends with the string specified here.
  - `exact <WORD>` The role is applied only when the ‘radius-user’ name, returned by the RADIUS server, exactly matches the string specified in the role.
    - `<WORD>` – Specify the exact string to match (this is case sensitive, and is compared against the ‘radius-user’ name returned by the RADIUS server). It should be an exact match.
    - Note: Provide the complete user name along with the realm.
  - `not-contains <WORD>` The role is applied only when the ‘radius-user’ name, returned by the RADIUS server, does not contain the string specified in the role.
    - `<WORD>` – Specify the string not to match (this is case sensitive, and is compared against the ‘radius-user’ name returned by the RADIUS server). It should not contain the provided expression.
**starts-with `<WORD>`**  
Enables role assignment on the basis of the wireless client’s “department” and/or “group” code  
- `<WORD>` – Specify the string (could be department/group code). For example: `0026100573`. The first three digits represent the department/group code. The remaining digits represent user’s badge number.  
The role is applied only when the ’radius-user’ name, returned by the RADIUS server, starts with the string specified here.

**Examples**
```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#radius-user contains test.com
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 1
  radius-user contains test.com
  company exact ExampleCompany
  emailid exact testing@examplecompany.com
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```

**Related Commands**
```
**no**  
Removes the radius-user filter
```
18.1.7.2.19 ssid

*user-role commands*

Configures a SSID based filter

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ssid [any|exact|contains|not-contains]
```

**Parameters**

- **ssid any**

  Specifies a wireless client filter based on how the SSID is specified in a WLAN
  - **any** – The role is applied to any SSID location. This is the default setting.

- **ssid [exact|contains|not-contains] <WORD>**

  Specifies a wireless client filter based on how the SSID is specified in a WLAN. This options are: contains, exact, or not-contains

  - **exact <WORD>**
    
    The role is applied only when the SSID, returned by the RADIUS server, exactly matches the string specified in the role.
    - **<WORD>** – Specify the SSID string to match. The SSID is case sensitive and is compared against the SSID configured for the WLAN.

  - **contains <WORD>**
    
    The role is applied only when the SSID, returned by the RADIUS server, contains the string specified in the role.
    - **<WORD>** – Specify the SSID string to match. The SSID is case sensitive and is compared against the SSID configured for the WLAN.

  - **not-contains <WORD>**
    
    The role is applied only when the SSID, returned by the RADIUS server, does not contain the string specified in the role.
    - **<WORD>** – Specify the SSID string not to match. The SSID is case sensitive and is compared against the SSID configured for the WLAN.
Examples

rfs7000-37FABE(config-role-policy-test-user-role-testing)#ssid not-contains DevUser

rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
  ssid not-contains DevUser
captive-portal authentication-state pre-login
city exact SanJose
country exact America
department exact TnV
eemailid exact testing@examplecompany.com
rfs7000-37FABE(config-role-policy-test-user-role-testing)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the SSID configured for a user-defined role</td>
</tr>
</tbody>
</table>
18.1.7.2.20 state

`user-role commands`

Configures a user role state to match with this user-defined role

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
state [any|contains|exact|not-contains]  
state [any|contains <WORD>|exact <WORD>|not-contains <WORD>]
```

**Parameters**

- `state [any|contains <WORD>|exact <WORD>|not-contains <WORD>]`

<table>
<thead>
<tr>
<th>state</th>
<th>Specifies a wireless client filter option based on how the RADIUS state matches the provided expression. Select one of the following options: any, contains, exact, or not-contains.</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>This user role can fit any wireless client irrespective of the state (no strings to match).</td>
</tr>
<tr>
<td>contains &lt;WORD&gt;</td>
<td>The user role is applied only when the RADIUS state contains the string specified in the role.</td>
</tr>
<tr>
<td>exact &lt;WORD&gt;</td>
<td>The role is applied only when the RADIUS state exactly matches the string specified in the role.</td>
</tr>
<tr>
<td>not-contains &lt;WORD&gt;</td>
<td>The role is applied only when the RADIUS state does not contain the string specified in the role.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#state exact active
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
ssid not-contains DevUser
captive-portal authentication-state pre-login
city exact SanJose
country exact America
department exact TnV
emailid exact testing@examplecompany.com
state exact active
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```
## Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the ‘state’ filter string associated with a user role</td>
</tr>
</tbody>
</table>
18.1.7.2.21 title

user-role commands

Configures a ‘title’ string to match

Supported in the following platforms:
• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
title [any|contains|exact|not-contains]
title [any|contains <WORD>|exact <WORD>|not-contains <WORD>]
```

Parameters

- title [any|contains <WORD>|exact <WORD>|not-contains <WORD>]

<table>
<thead>
<tr>
<th>title</th>
<th>Specifies a wireless client filter based on how the title string, returned by the RADIUS server, matches the provided expression. Select one of the following options: any, contains, exact, or not-contains.</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>This user role can fit any wireless client irrespective of the title (no strings to match).</td>
</tr>
<tr>
<td>contains &lt;WORD&gt;</td>
<td>The user role is applied only when the title string, returned by the RADIUS server, contains the string specified in the role.</td>
</tr>
<tr>
<td>exact &lt;WORD&gt;</td>
<td>The role is applied only when the title string, returned by the RADIUS server, exactly matches the string specified in the role.</td>
</tr>
<tr>
<td>not-contains &lt;WORD&gt;</td>
<td>The role is applied only when the title string, returned by the RADIUS server, does not contain the string specified in the role.</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#title any
```

Related Commands

```
no
```

Removes the ‘title’ filter string configured with a user role
18.1.7.2.22 use

user-role commands

Configures an access list based firewall with this user role

A firewall is a mechanism enforcing access control, and is considered a first line of defense in protecting proprietary information within the network. The means by which this is accomplished varies, but in principle, firewalls are mechanisms both blocking and permitting data traffic based on inbound and outbound IP and MAC rules.

IP based firewall rules are specific to source and destination IP addresses and the unique rules and precedence orders assigned. Both IP and non-IP traffic on the same layer 2 interface can be filtered by applying both an IP ACL and a MAC.

A MAC firewall rule uses source and destination MAC addresses for matching operations, where the result is a typical allow, deny or mark designation to packet traffic.

Supported in the following platforms:
• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

use [application-policy|bonjour-gw-discovery-policy|ip-access-list|ipv6-access-list|mac-access-list|url-filter]

use bonjour-gw-discovery-policy <POLICY-NAME>

use [ip-access-list|ipv6-access-list] [in|out] <IP/IPv6-ACCESS-LIST-NAME> precedence <1-100>

use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME> precedence <1-100>

use url-filter <URL-FILTER-NAME>

Parameters
• use application-policy|bonjour-gw-discovery-policy] <POLICY-NAME>

<table>
<thead>
<tr>
<th>application-policy &lt;POLICY-NAME&gt;</th>
<th>Uses an existing Application policy with a user role. When associated, the Application policy enforces application assurance for all users using this role.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;POLICY-NAME&gt; – Specify the Application policy name (should be existing and configured).</td>
</tr>
<tr>
<td>Note: For more information on Application policy, see application.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>bonjour-gw-discovery-policy &lt;POLICY-NAME&gt;</th>
<th>Uses an existing Bonjour GW Discovery policy with a user role. When associated, the Bonjour GW Discovery policy is applied for the Bonjour requests coming from this specific user roles.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;POLICY-NAME&gt; – Specify the Bonjour GW Discovery policy name (should be existing and configured).</td>
</tr>
<tr>
<td>Note: For more information on Bonjour GW Discovery policy, see bonjour-gw-discovery-policy.</td>
<td></td>
</tr>
</tbody>
</table>

| use [ip-access-list|ipv6-access-list] [in|out] <IP/IPv6-ACCESS-LIST-NAME> precedence <1-100> | Uses an IPv4 or IPv6 ACL with this user role |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------|
| ip-access-list [in|out] | in – Applies the rule to incoming packets |
|                                | • out – Applies the rule to outgoing packets |

| mac-access-list [in|out] | Uses a MAC ACL with this user role |
|--------------------------|-------------------------------------------------------------------------------------|
| url-filter <URL-FILTER-NAME> | Uses a URL filter with this user role |

| [ip-access-list|ipv6-access-list] [in|out] <IP/IPv6-ACCESS-LIST-NAME> precedence <1-100> | Uses an IPv4 or IPv6 ACL with this user role |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------|
| ip-access-list [in|out] | in – Applies the rule to incoming packets |
|                                | • out – Applies the rule to outgoing packets |

<p>| mac-access-list [in|out] | Uses a MAC ACL with this user role |
|--------------------------|-------------------------------------------------------------------------------------|
| url-filter &lt;URL-FILTER-NAME&gt; | Uses a URL filter with this user role |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`use ip-access-list [in</td>
<td>out] &lt;IPV4/IPv6-ACCESS-LIST-NAME&gt; precedence &lt;1-100&gt;`</td>
</tr>
<tr>
<td>`mac-access-list [in</td>
<td>out] &lt;MAC-ACCESS-LIST-NAME&gt; precedence &lt;1-100&gt;`</td>
</tr>
<tr>
<td><code>use url-filter &lt;URL-FILTER-NAME&gt;</code></td>
<td>Uses an existing URL filter that acts as a Web content filter firewall rule.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-role-policy-test-user-role-testing)#use ip-access-list in test precedence 9
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
ssid not-contains DevUser
 captive-portal authentication-state pre-login
city exact SanJose
company exact ExampleCompany
country exact America
department exact TnV
emailid exact testing@examplecompany.com
state exact active
use ip-access-list in test precedence 9
```

```plaintext
rfs7000-37FABE(config-role-policy-test-user-role-testing)#use url-filter <URL-FILTER-NAME>
```

```plaintext
rfs7000-37FABE(config-role-policy-test-user-role-testing)#use ip-access-list in test precedence 9
```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an IP, MAC access list, or a Bonjour GW Discovery policy from use with a user role</td>
</tr>
</tbody>
</table>
18.1.7.23 user-defined

user-role commands

Enables you to define a filter based on an attribute defined in the Active Directory or the OpenLDAP server.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
user-defined <ATTR-STRING> [any|contains|exact|not-contains]
user-defined <ATTR-STRING> [any|contains <WORD>|exact <WORD>|not-contains <WORD>]
```

Parameters

- `user-defined <ATTR-STRING> [any|exact <WORD>|contains <WORD>|not-contains <WORD>]`

```
<table>
<thead>
<tr>
<th>user-defined &lt;ATTR-STRING&gt;</th>
<th>Specify a filter based on an attribute defined in the AD or OpenLDAP server.</th>
</tr>
</thead>
<tbody>
<tr>
<td>any</td>
<td>No specific string to match. This role can be applied to any wireless client. This is the default setting.</td>
</tr>
<tr>
<td>contains &lt;WORD&gt;</td>
<td>The role is applied only when the user-defined attribute value, returned by the RADIUS server, contains the string specified in the role.</td>
</tr>
<tr>
<td>exact &lt;WORD&gt;</td>
<td>The role is applied only when the user-defined attribute value, returned by the RADIUS server, exactly matches the string specified in the role.</td>
</tr>
<tr>
<td>not-contains &lt;WORD&gt;</td>
<td>The role is applied only when the user-defined attribute value, returned by the RADIUS server, does not contain the string specified in the role.</td>
</tr>
</tbody>
</table>
```

Examples

```
rfs4000-229D58(config-role-policy-test-user-role-user1)#user-defined office-location exact EcoSpace
```

```
rfs4000-229D58(config-role-policy-test-user-role-user1)#show context
user-role user1 precedence 1
  employee-type exact consultant
  user-defined office-location exact EcoSpace
rfs4000-229D58(config-role-policy-test-user-role-user1)#
```

Related Commands

```
no
```

Removes the user-defined filter configured with this user role.
CHAPTER 19
SMART-RF-POLICY

This chapter summarizes *Self Monitoring at Run Time RF* (Smart RF) management policy commands in the CLI command structure.

A Smart RF management policy defines operating and recovery parameters that can be assigned to groups of access points. A Smart RF policy is designed to scan the network to identify the best channel and transmit power for each access point radio.

A Smart RF policy reduces deployment costs by scanning the RF environment to determine the best channel and transmit power configuration for each managed radio. Smart RF policies when applied to specific RF Domains, apply site specific deployment configurations and self-healing values to groups of devices within pre-defined physical RF coverage areas.

Smart RF centralizes the decision process and makes intelligent RF configuration decisions using information obtained from the RF environment. Smart RF helps reduce ongoing management and maintenance costs through the periodic re-calibration of the network. Re-calibration can be initiated manually or can be automatically scheduled to ensure the RF configuration is optimized to factor for RF environment changes (such as new sources of interference, or neighboring access points).

Smart RF also provides self-healing functions by monitoring the network in real-time, and provides automatic mitigation from potentially problematic events such as radio interference, coverage holes and radio failures. Smart RF employs self-healing to enable a WLAN to better maintain wireless client performance and site coverage during dynamic RF environment changes, which typically require manual re-configuration to resolve.

Smart RF is supported on any RF Domain manager. In standalone environments, an individual wireless controller manages the calibration and monitoring phases. In clustered environments, a single wireless controller is elected a Smart RF master and the remaining cluster members operate as Smart RF clients. In cluster operation, the Smart RF master co-ordinates the calibration and configuration and during the monitoring phase receives information from the Smart RF clients.

Before defining a Smart RF policy, refer to the following deployment guidelines to ensure the configuration is optimally effective:

- The Smart RF calibration process impacts associated users and should not be run during business or production hours. The calibration process should be performed during scheduled maintenance intervals or non-business hours.
- For Smart RF to provide effective recovery, RF planning must be performed to ensure overlapping coverage exists at the deployment site. Smart RF can only provide recovery when access points are deployed appropriately. Smart RF is not a solution, it's a temporary measure. Administrators need to determine the root cause of RF deterioration and fix it. Smart RF history/events can assist.

Keep in mind that if a Smart RF managed radio is operating in WLAN mode on a channel requiring DFS, it will switch channels if radar is detected.
If Smart RF is enabled, the radio picks a channel defined in the Smart RF policy.

If Smart RF is disabled, but a Smart RF policy is mapped, the radio picks channels specified in the Smart RF policy.

If no SMART RF policy is mapped, the radio selects a random channel.

If the radio is a dedicated sensor, it stops termination on that channel if a neighboring access point detect radar. The access point attempts to come back to its original channel (statically configured or selected by Smart RF) after the channel evacuation period has expired.

Change this behavior using the `dfs-rehome` command from the controller or service platform CLI. This keeps the radio on the newly selected channel and prevents the radio from coming back to the original channel, even after the channel evacuation period.

**NOTE:** Perform RF planning to ensure overlapping coverage exists at a deployment site, for Smart RF to be a viable network performance tool. Smart RF can only provide recovery when access points are deployed appropriately. Smart RF is not a solution, it is a temporary measure. You need to determine the root cause of RF deterioration and fix it. Smart RF history/events can assist in troubleshooting.

Use the (config) instance to configure Smart RF Policy related configuration commands. To navigate to the Smart RF policy instance, use the following commands:

```plaintext
<DEVICE>(config)#smart-rf-policy <POLICY-NAME>
```

```plaintext
rfs7000-37FABE(config)#smart-rf-policy test
```

```plaintext
rfs7000-37FABE(config-smart-rf-policy-test)#?
```

**Smart RF Mode commands:**
- `area` Specify channel list/ power for an area
- `assignable-power` Specify the assignable power during power-assignment
- `avoidance-time` Time to avoid a channel once dfs/adaptivity avoidance is necessary
- `channel-list` Select channel list for smart-rf
- `channel-width` Select channel width for smart-rf
- `coverage-hole-recovery` Recover from coverage hole
- `enable` Enable this smart-rf policy
- `group-by` Configure grouping parameters
- `interference-recovery` Recover issues due to excessive noise and interference
- `neighbor-recovery` Recover issues due to faulty neighbor radios
- `no` Negate a command or set its defaults
- `sensitivity` Configure smart-rf sensitivity (Modifies various other smart-rf configuration items)
- `smart-ocs-monitoring` Smart off channel scanning
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```plaintext
rfs7000-37FABE(config-smart-rf-policy-test)#
```

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
19.1 smart-rf-policy

The following table summarizes Smart RF policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>area</td>
<td>Configures the channel list and power for a specified area</td>
<td>page 19-4</td>
</tr>
<tr>
<td>assignable-power</td>
<td>Specifies the power range during power assignment</td>
<td>page 19-5</td>
</tr>
<tr>
<td>avoidance-time</td>
<td>Allows Smart RF-enabled radios to avoid Dynamic Frequency Selection (DFS) and/or adaptivity regulated channels on detection of interference or radar. This command configures the period for which the channel is avoided.</td>
<td>page 19-5</td>
</tr>
<tr>
<td>channel-list</td>
<td>Assigns the channel list for the selected frequency</td>
<td>page 19-8</td>
</tr>
<tr>
<td>channel-width</td>
<td>Selects the channel width for Smart RF configuration</td>
<td>page 19-9</td>
</tr>
<tr>
<td>coverage-hole-recovery</td>
<td>Enables recovery from errors</td>
<td>page 19-11</td>
</tr>
<tr>
<td>enable</td>
<td>Enables a Smart RF policy</td>
<td>page 19-13</td>
</tr>
<tr>
<td>group-by</td>
<td>Configures grouping parameters</td>
<td>page 19-14</td>
</tr>
<tr>
<td>interference-recovery</td>
<td>Recovers issues due to excessive noise and interference</td>
<td>page 19-15</td>
</tr>
<tr>
<td>neighbor-recovery</td>
<td>Enables recovery from errors due to faulty neighbor radios</td>
<td>page 19-17</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 19-19</td>
</tr>
<tr>
<td>sensitivity</td>
<td>Configures Smart RF sensitivity</td>
<td>page 19-21</td>
</tr>
<tr>
<td>smart-ocs-monitoring</td>
<td>Applies smart off-channel scanning instead of dedicated detectors</td>
<td>page 19-22</td>
</tr>
</tbody>
</table>

NOTE: For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
## 19.1.1 area

### smart-rf-policy

Configures the channel list and power for a specified area

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

### Syntax

```plaintext
area <AREA-NAME> channel-list [2.4GHz|5GHz] <CHANNEL-LIST>
```

### Parameters

- **area <AREA-NAME> channel-list [2.4GHz|5GHz] <CHANNEL-LIST>**

<table>
<thead>
<tr>
<th>area &lt;AREA-NAME&gt;</th>
<th>Specify the area name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-list</td>
<td>Selects the channels for the specified area in the 2.4 GHz or 5.0 GHz band</td>
</tr>
<tr>
<td>[2.4GHz</td>
<td>5GHz] &lt;CHANNEL-LIST&gt;</td>
</tr>
</tbody>
</table>

- **2.4GHz** – Selects the channels for the specified area in the 2.4 GHz band
- **5GHz** – Selects the channels for the specified area in the 5.0 GHz band

The following keyword is common to the 2.4 GHz and 5.0 GHz bands:
- **<CHANNEL-LIST>** – Enter a comma-separated list of channels for the selected band.

### Examples

```plaintext
rfs7000-37FABE(config-smart-rf-policy-test)#area test channel-list 2.4GHz 1,2,3
rfs7000-37FABE(config-smart-rf-policy-test)#show context
smart-rf-policy test
area test channel-list 2.4GHz 1,2,3
rfs7000-37FABE(config-smart-rf-policy-test)#
```

### Related Commands

- **no** — Removes channel list/power configuration for an area
### 19.1.2 assignable-power

#### smart-rf-policy

Configures the Smart RF power settings over both 2.4 GHZ and 5.0 GHZ radios

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

```
assignable-power [2.4GHz|5GHz] [max|min] <1-20>
```

#### Parameters

- `assignable-power [2.4GHz|5GHz] [max|min] <1-20>`

| 2.4GHz [max|min] <1-20> | Assigns a power range on the 2.4 GHz band |
|------------------------|------------------------------------------|
| 2.4GHz [max|min] <1-20> | Assigns a power range on the 2.4 GHz band |
| 5GHz [max|min] <1-20> | Assigns a power range on the 5.0 GHz band |

**Examples**

```
rfs7000-37FABE(config-smart-rf-policy-test)#assignable-power 5GHz max 20
rfs7000-37FABE(config-smart-rf-policy-test)#assignable-power 5GHz min 8
rfs7000-37FABE(config-smart-rf-policy-test)#show context
smart-rf-policy test
area test channel-list 2.4GHz 1,2,3
assignable-power 5GHz min 8
assignable-power 5GHz max 20
rfs7000-37FABE(config-smart-rf-policy-test)#
```

#### Related Commands

- `no` Resets assignable power to its default
19.1.3 avoidance-time

smart-rf-policy

Allows Smart-RF enabled radios to avoid channels with high levels of interference and channels where radar has been detected.

This command configures the interval for which a channel is avoided on detection of interference or radar, and is applicable only if the channel selection mode is set to Smart and a Smart-RF policy is applied to the access point’s RF Domain. For more information on configuring a radio’s channel of operation, see channel.

Certain 5.0 GHz channels are subject to FCC / ETSI DFS regulations that require channels transmitting critical radar signals to be free of interference from radio signals. Consequently, DFS-enabled 5.0 GHz radios scan and switch channels if radar is detected on their current channel of operation. If radar-free channels are not available, the radio stops transmitting until it identifies a radar-free channel.

Adaptivity is a new European Union (EU) stipulation that requires access points to monitor interference levels on their current channel of operation, and stop functioning on channels with interference levels exceeding ETSI-specified threshold values. When enabled, this feature ensures recovery by switching the radio to a new channel with less interference.

Once adaptivity or DFS is triggered, the radio’s channel is switched based on the channel selection mode specified. If the channel is fixed, the radio attempts to come back to its specified channel of operation after the DFS/adaptivity channel evacuation period has expired.

NOTE: To optionally disable the radio from switching back to its original channel of operation, execute the no > dfs-rehome command in the radio interface configuration mode of the access point’s profile or device. For more information, see dfs-rehome.

NOTE: For radio’s having channel selection mode set to ACS, Random, or Fixed adaptivity timeout can be configured in the access point’s radio interface mode. For more information, see adaptivity.

On the other hand, if the radio’s channel selection mode is set to Smart or ACS, once adaptivity or DFS is triggered, the channel is avoided until the avoidance-time, specified here, expires. Once the evacuation period has expired, the channel is free for use by both Smart-RF and ACS.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

avoidance-time [adaptivity|dfs] <30-3600>

Parameters

- avoidance-time [adaptivity|dfs] <30-3600>

| avoidance-time [adaptivity|dfs] | Configures the time for which a channel is avoided after dfs or adaptivity is triggered |
|---------------------------------|-------------------------------------------------------------------------------------|
|                                 | • adaptivity – Sets the time, in minutes, for which a radio avoids an adaptivity-regulated channel detected with interference |
|                                 | • dfs – Sets the time, in minutes, for which a radio avoids a DFS-regulated channel detected with radar |
|                                 | • <30-3600> – Specify a value from 30 - 3600 minutes. The default for both parameters is 90 minutes. |
Examples

nx4500-5CFA2B(config-smart-rf-policy-test)#avoidance-time adaptivity 200

nx4500-5CFA2B(config-smart-rf-policy-test)#avoidance-time dfs 300

nx4500-5CFA2B(config-smart-rf-policy-test)#show context
smart-rf-policy test
 avoidance-time dfs 300
 avoidance-time adaptivity 200

nx4500-5CFA2B(config-smart-rf-policy-test)#no avoidance-time adaptivity

nx4500-5CFA2B(config-smart-rf-policy-test)#show context include-factory | include avoidance-time
 avoidance-time dfs 300
 avoidance-time adaptivity 90

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Reverts the DFS/adaptivity regulated channel avoidance time to default (90 minutes)</td>
</tr>
</tbody>
</table>
**19.1.4 channel-list**

*smart-rf-policy*

Assigns a list of channels, for the selected frequency, used in Smart RF scans

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
channel-list [2.4GHz|5GHz] <WORD>
```

**Parameters**

- `channel-list [2.4GHz|5GHz] <WORD>`

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4GHz &lt;WORD&gt;</td>
<td>Assigns a channel list for the 2.4 GHz band</td>
</tr>
<tr>
<td>5GHz &lt;WORD&gt;</td>
<td>Assigns a channel list for the 5.0 GHz band</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4GHz &lt;WORD&gt;</td>
<td>Assigns a channel list for the 2.4 GHz band</td>
</tr>
<tr>
<td>5GHz &lt;WORD&gt;</td>
<td>Assigns a channel list for the 5.0 GHz band</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-smart-rf-policy-test)#channel-list 2.4GHz 1,12
rfs7000-37FABE(config-smart-rf-policy-test)#show context
smart-rf-policy_test
  area test channel-list 2.4GHz 1,2,3
  assignable-power 5GHz min 8
  assignable-power 5GHz max 20
  channel-list 2.4GHz 1,12
rfs7000-37FABE(config-smart-rf-policy-test)#
```

**Related Commands**

- `no` Removes the channel list for the selected frequency
19.1.5 channel-width

Selects the channel width for Smart RF configuration

**NOTE:** In addition to 20 MHz and 40 MHz, AP82XX also provides support for 80 MHz channels.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

channel-width [2.4GHz|5GHz]

channel-width 2.4GHz [20MHz|40MHz|auto]
channel-width 5GHz [20MHz|40MHz|80MHz|auto]

**Parameters**

- **channel-width 2.4GHz [20MHz|40MHz|auto]**

| 2.4GHz [20MHz|40MHz|auto] | Assigns the channel width for the 2.4 GHz band |
|---------------------------|-----------------------------------------------|
| 20MHz                    | Assigns the 20 MHz channel width. This is the default setting. |
| 40MHz                    | Assigns the 40 MHz channel width. |
| auto                     | Assigns the best possible channel in the 20 MHz or 40 MHz channel width |

- **channel-width 5GHz [20MHz|40MHz|80MHz|auto]**

| 5GHz [20MHz|40MHz|80MHz|auto] | Assigns the channel width for the 5.0 GHz band |
|---------------------------------------|-----------------------------------------------|
| 20MHz                                 | Assigns the 20 MHz channel width |
| 40MHz                                 | Assigns the 40 MHz channel width. This is the default setting. |
| 80MHz                                 | Assigns the 80 MHz channel width (supported only on AP8232) |
| auto                                  | Assigns the best possible channel in the 20 MHz, 40 MHz, or 80 MHz channel width |

**Usage Guidelines**

The 20/40 MHz operation allows the access point to receive packets from clients using 20 MHz, and transmit using 40 MHz. This mode is supported for 802.11n users on both the 2.4 GHz and 5.0 GHz radios. If an 802.11n user selects two channels (a primary and secondary channel), the system is configured for dynamic 20/40 operation. When 20/40 is selected, clients can take advantage of wider channels. 802.11n clients experience improved throughput using 40 MHz while legacy clients (either 802.11a or 802.11b/g depending on the radio selected) can still be serviced without interruption using 20 MHz. Select **auto** to enable automatic assignment of channels to working radios to avoid channel overlap and avoid interference from external RF sources.
Examples

rfs7000-37FABE(config-smart-rf-policy-test)#channel-width 5GHz auto

rfs7000-37FABE(config-smart-rf-policy-test)#show context
smart-rf-policy test
area test channel-list 2.4GHz 1,2,3
assignable-power 5GHz min 8
assignable-power 5GHz max 20
channel-list 2.4GHz 1,12
channel-width 5GHz auto
rfs7000-37FABE(config-smart-rf-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Resets channel width for the selected frequency to its default</td>
</tr>
</tbody>
</table>
19.1.6 coverage-hole-recovery

Enables recovery from coverage hole errors detected by Smart RF. Use this command to configure the coverage hole recovery settings.

When coverage hole recovery is enabled, on detection of a coverage hole, Smart RF first determines the power increase needed based on the signal-to-noise ratio (SNR) for a client as seen by the access point radio. If a client’s SNR is above the specified threshold, the transmit power is increased until the SNR falls below the threshold.

**NOTE:** The coverage-hole-recovery parameters can be modified only if the sensitivity level is set to ‘custom’. For more information, see sensitivity.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

coverage-hole-recovery {client-threshold|coverage-interval|interval|snr-threshold}

coverage-hole-recovery {client-threshold [2.4GHz|5GHz] <1-255>}

coverage-hole-recovery {coverage-interval|interval} [2.4GHz|5GHz] <1-120>

coverage-hole-recovery {snr-threshold [2.4GHz|5GHz] <1-75>}

**Parameters**

- **client-threshold**
  
  Optional. Specifies the minimum number of clients associated to a radio in order to trigger coverage hole recovery.

  2.4GHz <1-255>

  Specifies the minimum number of clients on the 2.4 GHz band
  - <1-255> – Sets a value from 1 - 255. The default is 1.

  5GHz <1-255>

  Specifies the minimum number of clients on the 5.0 GHz band
  - <1-255> – Sets a value from 1 - 255. The default is 1.

- **coverage-interval**
  
  Optional. Specifies the interval between the discovery of a coverage hole and the initiation of coverage hole recovery

  2.4GHz <1-120>

  The following keywords are common to the ‘coverage-interval’ and ‘interval’ parameters:
  - 2.4GHz <1-120> – Specifies the coverage hole recovery interval on the 2.4 GHz band
  - <1-120> – Specify a value from 1 - 120 seconds.

  **Note:** coverage-interval – The default is 10 seconds.

  **Note:** interval – The default is 30 seconds.
| 5GHz <1-120> | The following keywords are common to the 'coverage-interval' and 'interval' parameters:  
  • 5GHz <1-120> – Specifies a coverage hole recovery interval on the 5.0 GHz band  
  • <1-120> – Specify a value from 1 - 120 seconds.  
  **Note:** coverage-interval – The default is 10 seconds.  
  **Note:** interval – The default is 30 seconds. |

- coverage-hole-recovery \{snr-threshold\} [2.4Ghz|5Ghz] <1-75>

| snr-threshold | Optional. Specifies the SNR threshold. This value is the SNR threshold for an associated client as seen by its associated AP radio. When the SNR threshold is exceeded, the radio increases its transmit power to increase coverage for the associated client. |

| 2.4GHz <1-75> | Specifies SNR threshold on the 2.4 GHz band  
  • <1-75> – Sets a value from 1 dB - 75 dB. The default is 20 dB. |

| 5GHz <1-75> | Specifies SNR threshold on the 5.0 GHz band  
  • <1-75> – Sets a value from 1 - 75. The default is 20 dB. |

**Examples**

```plaintext
rfs7000-37FABE(config-smart-rf-policy-test)#coverage-hole-recovery snr-threshold 5GHz 1
rfs7000-37FABE(config-smart-rf-policy-test)#show context smart-rf-policy test  
area test channel-list 2.4GHz 1,2,3  
sensitivity custom  
assignable-power 5GHz min 8  
assignable-power 5GHz max 20  
channel-list 2.4GHz 1,12  
channel-width 5GHz auto  
coverage-hole-recovery snr-threshold 5GHz 1
rfs7000-37FABE(config-smart-rf-policy-test)#
```

**Related Commands**

| no | Disables recovery from coverage hole errors |
19.1.7 enable

smart-rf-policy

Enables a Smart RF policy

Use this command to enable this Smart RF policy. Once enabled, the policy can be assigned to a RF Domain supporting a network.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
enable

Parameters
None

Examples
rfs7000-37FABE(config-smart-rf-policy-test)#enable

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables a Smart RF policy</td>
</tr>
</tbody>
</table>
19.1.8 group-by

smart-rf-policy

Enables grouping of APs on the basis of their location in a building (floor) or an area

Within a large RD Domain, grouping of APs (within an area or on the same floor in a building) facilitates statistics gathering and troubleshooting.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533

- Wireless Controllers — RFS4000, RFS6000, RFS7000

- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
group-by [area|floor]
```

Parameters

- `group-by [area|floor]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>area</td>
<td>Groups radios based on their area of location</td>
</tr>
<tr>
<td>floor</td>
<td>Groups radios based on their floor location</td>
</tr>
</tbody>
</table>

Note: Both options are disabled by default.

Examples

```
rfs7000-37FABE(config-smart-rf-policy-test)#group-by floor

rfs7000-37FABE(config-smart-rf-policy-test)#show context smart-rf-policy test
   area test channel-list 2.4GHz 1,2,3
group-by floor
   sensitivity custom
   assignable-power 5GHz min 8
   assignable-power 5GHz max 20
   channel-list 2.4GHz 1,12
   channel-width 5GHz auto
   coverage-hole-recovery snr-threshold 5GHz 1
rfs7000-37FABE(config-smart-rf-policy-test)#
```

Related Commands

- `no` Removes Smart RF group settings
### 19.1.9 interference-recovery

*smart-rf-policy*

Enables interference recovery from neighboring radios and other sources of WiFi and non-WiFi interference. Interference is the excess noise detected within the Smart RF supported radio coverage area. Smart RF provides mitigation from interfering sources by monitoring the noise levels and other RF parameters on an access point radio's current channel. When a noise threshold is exceeded, Smart RF selects an alternative channel with less interference. To avoid channel flapping a hold timer is defined, which disables interference avoidance for a specific period of time upon detection. Interference recovery is enabled by default.

**NOTE:** The interference-recovery parameters can be modified only if the sensitivity level is set to 'custom'. For more information, see *sensitivity*.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

- `interference-recovery {channel-hold-time|channel-switch-delta|client-threshold|interference|neighbor-offset|noise|noise-factor}
- `interference-recovery {channel-switch-delta [2.4GHz|5GHZ] <5-35>}
- `interference-recovery {channel-hold-time <0-86400>|client-threshold <1-255>|interference|neighbor-offset <3-10>|noise|noise-factor <1.0-3.0>}

**Parameters**

- `interference-recovery {channel-switch-delta [2.4GHz|5GHZ] <5-35>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-switch-delta</td>
<td>Optional. Configures a threshold value for the difference between interference levels on the current channel and the prospective channel needed to trigger a channel change. If the difference in noise levels on the current channel and the prospective channel is below the configured threshold, the channel is not changed.</td>
</tr>
<tr>
<td>[2.4GHz</td>
<td>5GHz]</td>
</tr>
<tr>
<td>&lt;5-35&gt;</td>
<td>Specifies the threshold value for the difference between the current and prospective channel interference levels</td>
</tr>
<tr>
<td></td>
<td>• &lt;5-35&gt; — Sets a value from 5 dBm - 35 dBm. The default setting is 20 dBm for both 2.4 GHz and 5.0 GHz bands.</td>
</tr>
</tbody>
</table>

- `interference-recovery {channel-hold-time <0-86400>|client-threshold <1-255>|interference|neighbor-offset <3-10>|noise|noise-factor <1.0-3.0>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-hold-time</td>
<td>Optional. Defines the minimum time between two channel change recoveries</td>
</tr>
<tr>
<td>&lt;0-86400&gt;</td>
<td>• &lt;0-86400&gt; — Sets the time, in seconds, between channel change assignments based on interference or noise. The default is 7,200 seconds.</td>
</tr>
</tbody>
</table>
### Examples

```bash
rfs7000-37FABE(config-smart-rf-policy-test)#interference-recovery channel-switch-delta 5GHz 5
rfs7000-37FABE(config-smart-rf-policy-test)#show context
smart-rf-policy test
  area test channel-list 2.4GHz 1,2,3
group-by floor
  sensitivity custom
assignable-power 5GHz min 8
assignable-power 5GHz max 20
channel-list 2.4GHz 1,12
channel-width 5GHz auto
interference-recovery channel-switch-delta 5GHz 5
coverage-hole-recovery snr-threshold 5GHz 1
rfs7000-37FABE(config-smart-rf-policy-test)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables recovery from excessive noise and interference</td>
</tr>
</tbody>
</table>
**19.1.10 neighbor-recovery**

*smart-rf-policy*

Enables recovery from errors due to faulty neighboring radios. Enabling neighbor recovery ensures automatic recovery from failed radios within the radio coverage area. Smart RF instructs neighboring access points to increase their transmit power to compensate for the failed radio. Neighbor recovery is enabled by default when the sensitivity setting is medium.

---

**NOTE:** The neighbor-recovery parameters can be modified only if the sensitivity level is set to ‘custom’. For more information, see sensitivity.

---

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

neighbor-recovery {dynamic-sampling|power-hold-time|power-threshold}

neighbor-recovery {dynamic-sampling} {retries <1-10>|threshold <1-30>}

neighbor-recovery {power-hold-time <0-3600>}

neighbor-recovery {power-threshold [2.4Ghz|5Ghz] <-85--55>}

**Parameters**

- neighbor-recovery {dynamic-sampling} {retries <1-10>|threshold <1-30>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dynamic-sampling</td>
<td>Optional. Enables dynamic sampling on this Smart RF policy. Dynamic sampling allows you to define how Smart RF adjustments are triggered by locking the 'retry' and 'threshold' values. Dynamic sampling is disabled by default.</td>
</tr>
<tr>
<td>retries &lt;1-10&gt;</td>
<td>Optional. Specifies the number of retries before allowing a power level adjustments to compensate for a potential coverage hole.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-10&gt; – Sets the number of retries from 1 - 10. The default is 3.</td>
</tr>
<tr>
<td>threshold &lt;1-30&gt;</td>
<td>Optional. Specifies the minimum number of sample reports before which a power change requires dynamic sampling</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-30&gt; – Sets the minimum number of reports from 1 - 30. The default is 5.</td>
</tr>
<tr>
<td>power-hold-time</td>
<td>Optional. Specifies the minimum time, in seconds, between two power changes on a radio during neighbor-recovery</td>
</tr>
<tr>
<td>&lt;0-3600&gt;</td>
<td>Sets the time from 0 - 3600 sec. The default is 0 seconds.</td>
</tr>
<tr>
<td>power-threshold</td>
<td>Optional. Specifies the power threshold based on which recovery is performed</td>
</tr>
<tr>
<td>[2.4Ghz</td>
<td>5Ghz] &lt;-85--55&gt;</td>
</tr>
</tbody>
</table>
**Examples**

rfs7000-37FABE(config-smart-rf-policy-test)#neighbor-recovery power-threshold 2.4GHz -82

rfs7000-37FABE(config-smart-rf-policy-test)#neighbor-recovery power-threshold 5GHz -65

rfs7000-37FABE(config-smart-rf-policy-test)#show context smart-rf-policy test

area test channel-list 2.4GHz 1,2,3
group-by floor
sensitivity custom
assignable-power 5GHz min 8
assignable-power 5GHz max 20
channel-list 2.4GHz 1,12
channel-width 5GHz auto
interference-recovery channel-switch-delta 5GHz 5
neighbor-recovery power-threshold 5GHz -65
neighbor-recovery power-threshold 2.4GHz -82
coverage-hole-recovery snr-threshold 5GHz 1
rfs7000-37FABE(config-smart-rf-policy-test)#

**Related Commands**

<table>
<thead>
<tr>
<th><code>no</code></th>
<th>Disables recovery from faulty neighbor radios</th>
</tr>
</thead>
</table>

---

**[2.4GHz][5GHz]**

- Selects the band
  - 2.4GHz – Selects the 2.4 GHz band
  - 5GHz – Selects the 5.0 GHz band

- `<-85--55>` Specify the threshold value
  - `<-85--55>` – Sets the power threshold from -85 dBm to -55 dBm. The default is -70 dBm for both the 2.4 GHz and 5.0 GHz bands.
19.1.11 no

Negates a command or sets its default. When used in the config Smart RF policy mode, the no command disables or resets Smart RF settings.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [area|assignable-power|avoidance-time|channel-list|channel-width|
coverage-hole-recovery|enable|group-by|interference-recovery|neighbor-recovery|
smart-ocs-monitoring]

no area <AREA-NAME> channel-list [2.4GHZ|5GHZ]
no assignable-power [2.4GHZ|5GHZ] [max|min]
no [channel-list|channel-width] [2.4GHZ|5GHZ]
no coverage-hole-recovery [client-threshold|coverage-interval|interval|snr-threshold]
[2.4GHZ|5GHZ]
no avoidance-time [adaptivity|dfs]
no enable
no group-by [area|floor]
no interference-recovery {channel-hold-time|channel-switch-delta [2.4GHZ|5GHZ]|
client-threshold|interference|neighbor-offset|noise|noise-factor}
no neighbor-recovery {dynamic-sampling {retries|threshold}|power-hold-time|
power-threshold [2.4GHZ|5GHZ]}
no smart-rf-monitoring {awareness-override [schedule <1-3>|threshold]|
client-aware [2.4GHZ|5GHZ]|extended-scan-frequency [2.4GHZ|5GHZ]|
frequency [2.4GHZ|5GHZ]|off-channel-duration [2.4GHZ|5GHZ]|
power-save-aware [2.4GHZ|5GHZ]|sample-count [2.4GHZ|5GHZ]|voice-aware [2.4GHZ|5GHZ]}

Parameters

- no <PARAMETERS>

Examples

The following example shows the Smart RF policy 'test' settings before the 'no' commands are executed:

rfs7000-37FABE(config-smart-rf-policy-test)#show context
smart-rf-policy test
area test channel-list 2.4GHz 1,2,3
group-by floor
sensitivity custom
assignable-power 5GHz min 8
assignable-power 5GHz max 20
channel-list 2.4GHz 1,12
channel-width 5GHz auto
interference-recovery channel-switch-delta 5GHz 5
neighbor-recovery power-threshold 5GHz -65
neighbor-recovery power-threshold 2.4GHz -82

Negates a command or sets its default. When used in the config Smart RF policy mode, the no command disables or resets the Smart RF policy settings.
coverage-hole-recovery snr-threshold 5GHz 1
rfs7000-37FABE(config-smart-rf-policy-test)#
no interference-recovery channel-switch-delta 5GHz
rfs7000-37FABE(config-smart-rf-policy-test)#
no neighbor-recovery power-threshold 2.4GHz
rfs7000-37FABE(config-smart-rf-policy-test)#
no neighbor-recovery power-threshold 5GHz
rfs7000-37FABE(config-smart-rf-policy-test)#
no assignable-power 5GHz min
rfs7000-37FABE(config-smart-rf-policy-test)#
no assignable-power 5GHz max

The following example shows the Smart RF policy 'test' settings after the 'no' commands are executed:

rfs7000-37FABE(config-smart-rf-policy-test)#
show context
smart-rf-policy test
area test channel-list 2.4GHz 1,2,3
group-by floor
sensitivity custom
channel-list 2.4GHz 1,12
channel-width 5GHz auto
coverage-hole-recovery snr-threshold 5GHz 1
rfs7000-37FABE(config-smart-rf-policy-test)#
19.1.12 sensitivity

 smart-rf-policy

Configures Smart RF sensitivity level. The sensitivity level determines Smart RF scanning and sampling aggressiveness. For example, a low sensitivity level indicates a less aggressive Smart-RF policy. This translates to fewer samples taken during off-channel scanning and short off-channel durations. When the sensitivity level is set to high, Smart-RF collects more samples, and remains off-channel longer.

The Smart RF sensitivity level options include low, medium, high, and custom. Medium is the default setting. The custom option allows an administrator to adjust the parameters and thresholds for interference recovery, coverage hole recovery, and neighbor recovery. However, the low, medium, and high settings still allow utilization of these features.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

sensitivity [custom|high|low|medium]

Parameters

- sensitivity [custom|high|low|medium]

<table>
<thead>
<tr>
<th>sensitivity</th>
<th>Configures Smart RF sensitivity levels. The options available are: custom, high, low, and medium.</th>
</tr>
</thead>
<tbody>
<tr>
<td>custom</td>
<td>Enables custom interference recovery, coverage hole recovery, and neighbor recovery as additional Smart RF options</td>
</tr>
<tr>
<td>high</td>
<td>High sensitivity</td>
</tr>
<tr>
<td>low</td>
<td>Low sensitivity</td>
</tr>
<tr>
<td>medium</td>
<td>Medium sensitivity. This is the default setting.</td>
</tr>
</tbody>
</table>

Usage Guidelines

To enable the power and channel setting parameters, set sensitivity to custom or medium.

To enable the monitoring and scanning parameters, set sensitivity to custom.

To enable the neighbor recovery, interference and coverage hole recovery parameters, set sensitivity to custom.

Examples

rfs7000-37FABE(config-smart-rf-policy-test)#sensitivity high

rfs7000-37FABE(config-smart-rf-policy-test)#show context
smart-rf-policy test
  area test channel-list 2.4GHz 1,2,3
group-by floor
sensitivity high
  channel-list 2.4GHz 1,12
  channel-width 5GHz auto
  smart-ocs-monitoring frequency 5GHz 3
  smart-ocs-monitoring frequency 2.4GHz 3
  smart-ocs-monitoring sample-count 5GHz 3
  smart-ocs-monitoring sample-count 2.4GHz 3
--More--
rfs7000-37FABE(config-smart-rf-policy-test)#
19.1.13 smart-ocs-monitoring

Applies smart Off Channel Scanning (OCS) instead of dedicated detectors

Supported in the following platforms:
• Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
• Wireless Controllers — RFS4000, RFS6000, RFS7000
• Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
smart-ocs-monitoring {awareness-override|client-aware|extended-scan-frequency|frequency|off-channel-duration|power-save-aware|sample-count|tx-load-aware|voice-aware}

smart-ocs-monitoring {awareness-override [schedule|threshold]}
smart-ocs-monitoring {awareness-override schedule <1-3> <START-TIME> <END-TIME> [DAY]}
smart-ocs-monitoring {awareness-override threshold <10-10000>}

smart-ocs-monitoring {client-aware [2.4GHz|5GHz] <1-255>}
smart-ocs-monitoring {extended-scan-frequency [2.4GHz|5GHz] <0-50>}
smart-ocs-monitoring {frequency [2.4GHz|5GHz] <1-120>}
smart-ocs-monitoring {off-channel-duration [2.4GHz|5GHz] <20-150>}
smart-ocs-monitoring {power-save-aware [2.4GHz|5GHz] [disable|dynamic|strict]}
smart-ocs-monitoring {sample-count [2.4GHz|5GHz] <1-15>}
smart-ocs-monitoring {tx-load-aware [2.4GHz|5GHz] <1-100>}
smart-ocs-monitoring {voice-aware [2.4GHz|5GHz] [disable|dynamic|strict]}

Parameters
• smart-ocs-monitoring {awareness-override schedule <1-3> <START-TIME> <END-TIME> [DAY]}

<table>
<thead>
<tr>
<th>awareness-override</th>
<th>Optional. Use this parameter to configure client awareness settings overrides</th>
</tr>
</thead>
<tbody>
<tr>
<td>schedule &lt;1-3&gt;</td>
<td>Configures a time and day schedule when awareness settings are overridden</td>
</tr>
<tr>
<td>&lt;START-TIME&gt;</td>
<td>• &lt;1-3&gt; – Sets the awareness override schedule index. A maximum of three</td>
</tr>
<tr>
<td>&lt;END-TIME&gt;</td>
<td>overrides can be configured.</td>
</tr>
<tr>
<td>{DAY}&gt;</td>
<td>• &lt;START-TIME&gt; – Sets the override start time in HH:MM format</td>
</tr>
<tr>
<td></td>
<td>• &lt;END-TIME&gt; – Sets the override end time in HH:MM format</td>
</tr>
<tr>
<td></td>
<td>• DAY – Optional. Set the day when the override is active. Use one of the fol-</td>
</tr>
<tr>
<td></td>
<td>lowing formats:</td>
</tr>
<tr>
<td></td>
<td>• all – Override is active on all days</td>
</tr>
<tr>
<td></td>
<td>• sun – Override is active only on Sundays</td>
</tr>
<tr>
<td></td>
<td>• mon – Override is active only on Mondays</td>
</tr>
<tr>
<td></td>
<td>• tue – Override is active only on Tuesdays</td>
</tr>
<tr>
<td></td>
<td>• wed – Override is active only on Wednesdays</td>
</tr>
<tr>
<td></td>
<td>• thu – Override is active only on Thursdays</td>
</tr>
<tr>
<td></td>
<td>• fri – Override is active only on Fridays</td>
</tr>
<tr>
<td></td>
<td>• sat – Override is active only on Saturdays</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>awareness-override threshold</td>
<td>Use this parameter to configure client awareness settings overrides.</td>
</tr>
</tbody>
</table>
| threshold <10-10000>            | threshold – Specifies the threshold after which client awareness settings are overridden. When the specified threshold is reached, awareness settings are overridden.  
|                                 | <10-10000> – Specify a threshold value from 10 -10000. The default is 10.                                                                                                                           |                  |
| client-aware 2.4GHz <1-255>     | Enables client aware scanning on the 2.4 GHz band  
|                                 | Avoids radio scanning when a specified minimum number of clients are present  
|                                 | <1-255> – Sets the minimum number of clients from 1 - 255. The default is 1 client.                                                                                                                     |                  |
| client-aware 5GHz <1-255>       | Enables client aware scanning on the 5.0 GHz band  
|                                 | Avoids radio scanning when a specified minimum number of clients are present  
|                                 | <1-255> – Sets the minimum number of clients from 1 - 255. The default is 1 client.                                                                                                                     |                  |
| extended-scan-frequency 2.4GHz  | Enables an extended scan, as opposed to a neighbor only scan, on this Smart RF policy.                                                                                                                | <0-50>           |
| 5GHz <0-50>                     | Enables extended scan on the 2.4 GHz band  
|                                 | <0-50> – Sets the number of trails from 0 - 50. The default is 5.                                                                                                                                    |                  |
| extended-scan-frequency 5GHz    | Enables extended scan on the 5.0 GHz band  
|                                 | <0-50> – Sets the number of trails from 0 - 50. The default is 5.                                                                                                                                    |                  |
| frequency 2.4GHz <1-120>        | Selects the 2.4 GHz band  
|                                 | <1-120> – Sets a scan frequency from 1 - 120 sec. The default is 6 seconds.                                                                                                                             |                  |
| frequency 5GHz <1-120>          | Selects the 5.0 GHz band  
|                                 | <1-120> – Sets a scan frequency from 1 - 120 sec. The default is 6 seconds.                                                                                                                             |                  |
| off-channel-duration 2.4GHz     | Selects the 2.4 GHz band  
|                                 | <20-150> – Sets the off channel duration from 20 - 150 msec. The default is 50 milliseconds.                                                                                                       |                  |
| 5GHz <20-150>                   | Selects the 2.4 GHz band (in milliseconds)  
|                                 | <20-150> – Sets the off channel duration from 20 - 150 msec. The default is 50 milliseconds.                                                                                                       |                  |
5GHz <20-150> Selects the 5.0 GHz band (in milliseconds)
• <20-150> – Sets the off channel duration from 20 - 150 msec. The default is 50 milliseconds.

• smart-ocs-monitoring {power-save-aware [2.4GHz|5GHz] [disable|dynamic|strict]}

power-save-aware Optional. Enables power save awareness scanning mode on this Smart RF policy. The options are: disable, dynamic, and strict. This setting allows Smart RF to detect power save clients and take them into consideration when performing off channel scans. Strict disables smart monitoring as long as a power save capable client is associated to a radio. Dynamic disables smart monitoring as long as there is data buffered for a power save client at the radio.

2.4GHz [disable|dynamic|strict] Sets power save awareness scanning mode on the 2.4 GHz band
• disable – Disables power save awareness scanning
• dynamic – Dynamically avoids scanning based on traffic for power save (PSP) clients
• strict – Strictly avoids scanning when PSP clients are present

Note: The default is dynamic.

5GHz [disable|dynamic|strict] Sets power save awareness scanning mode on the 5.0 GHz band
• disable – Disables power save awareness scanning
• dynamic – Dynamically avoids scanning based on traffic for PSP clients
• strict – Strictly avoids scanning when PSP clients are present

Note: The default is dynamic.

• smart-ocs-monitoring {sample-count [2.4GHz|5GHz] <1-15>}

sample-count Optional. Specifies the number of samples to collect before reporting an issue to the Smart RF master

2.4GHz <1-15> Selects the 2.4 GHz band
• <1-15> – Specifies the number of samples to collect from 1 - 15. The default is 10.

5GHz <1-15> Selects the 5.0 GHz band
• <1-15> – Specifies the number of samples to collect from 1 - 15. The default is 5.

• smart-ocs-monitoring {tx-load-aware [2.4GHz|5GHz] <1-100>}

tx-load-aware Optional. Specifies a transmit load percentage that serves as a threshold before scanning is avoided for an access point's 2.4 GHz or 5.0 GHz band. This option is disabled for both 2.4 GHz and 5.0 GHz bands.

2.4GHz <1-100> Selects the 2.4 GHz band
• <1-100> – Specify a transmit load percentage from 1 - 100%. When enabled, the default is 1%.

5GHz <1-100> Selects the 5.0 GHz band
• <1-100> – Specify a transmit load percentage from 1 - 100%. When enabled, the default is 1%.
- `smart-ocs-monitoring {voice-aware [2.4GHz|5GHz] [disable|dynamic|strict]}`

<table>
<thead>
<tr>
<th>voice-aware</th>
<th>Optional. Enables voice awareness scanning mode on this Smart RF policy. The options are: disable, dynamic, and strict. Strict disables smart monitoring as long as a voice client is associated to a radio. Dynamic disables smart monitoring as long as there is data buffered for a voice client at the radio.</th>
</tr>
</thead>
</table>
| 2.4GHz [disable|dynamic|strict] | Specifies the scanning mode on the 2.4 GHz band  
- disable – Disables voice awareness scanning  
- dynamic – Dynamically avoids scanning based on traffic for voice clients  
- strict – Strictly avoids scanning when voice clients are present  
**Note:** The default is dynamic. |
| 5GHz [disable|dynamic|strict] | Specifies the scanning mode on the 5.0 GHz band  
- disable – Disables voice awareness scanning  
- dynamic – Dynamically avoids scanning based on traffic for voice clients  
- strict – Strictly avoids scanning when voice clients are present.  
**Note:** The default is dynamic. |

**Examples**

```bash
rfs7000-37FABE(config-smart-rf-policy-test)#smart-ocs-monitoring extended-scan-frequency 2.4GHz 9
rfs7000-37FABE(config-smart-rf-policy-test)#smart-ocs-monitoring sample-count 2.4GHz 3

rfs7000-37FABE(config-smart-rf-policy-test)#show context
smart-rf-policy test
  area test channel-list 2.4GHz 1,2,3
  group-by floor
  sensitivity custom
  channel-list 2.4GHz 1,12
  channel-width 5GHz auto
  smart-ocs-monitoring off-channel-duration 2.4GHz 25
  smart-ocs-monitoring frequency 5GHz 3
  smart-ocs-monitoring frequency 2.4GHz 3
  smart-ocs-monitoring sample-count 5GHz 3
  smart-ocs-monitoring sample-count 2.4GHz 3
  smart-ocs-monitoring extended-scan-frequency 5GHz 0
  smart-ocs-monitoring extended-scan-frequency 2.4GHz 9
  root-recovery root-path-metric-threshold 800
--More--
rfs7000-37FABE(config-smart-rf-policy-test)#
```

**Related Commands**

| `no` | Disables off channel monitoring |
This chapter summarizes the *Wireless Intrusion Protection Systems* (WIPS) policy commands in the CLI command structure.

WIPS is an additional measure of security designed to continuously monitor the network for threats and intrusions. Along with wireless VPNs, encryptions, and authentication policies, WIPS enhances the security of a WLAN.

The WIPS policy enables detection of intrusions and threats that a managed network is likely to encounter. However, the WIPS policy does not include threat mitigation configurations. These intrusions and threats are available within the WIPS policy configuration mode as pre-configured, fixed events. Each event consists of a set of frames or anomalies that may be harmful to the managed network. You can enable/disable various aspects of each individual event.

Events are broadly grouped into the following three categories:

- **Excessive/Thresholdable events**: These events detect DOS attacks, like excessive deauths, EAP floods, etc. Threshold limits for such events can be configured for *mobile units* (MU) and radios. Once these threshold limits are exceeded, an event is triggered. Stations triggering an event are usually filtered. You can configure a filter ageout specifying the time for which the station, triggering the event, is filtered. However, the filter ageout only applies when the MU-threshold is exceeded. When radio threshold is reached, the system raises a warning about the same and updates event history with event details.

- **Station/MU anomalies**: These events are triggered when a MU performs suspicious activities that can compromise the security and stability of the managed network. You can configure a filter ageout, similar to the above class of events, to filter the station triggering such events.

- **AP/neighbor anomalies**: These events are triggered when an AP or neighbor sends suspicious frames. The system cannot filter APs or neighbors triggering such events. However, the system warns you about such attacks, allowing you to take further actions against such APs and neighbors.

In addition to event monitoring configuration, the WIPS policy allows you to configure a list of signatures. Unlike events, signatures are not fixed. You are free to define your own signatures based on a specific set of parameters. A signature is a rule, consisting of a set of fields to match and a corresponding set of actions in case of a match. By default, whenever a signature is matched an event log is triggered. This event log is similar to the one triggered upon an event. In addition to an event log, you can also configure other actions. Signatures have all the features supported by events. In fact, most events are internally implemented as signatures.

Signature rules are of the following three types:

- **ssid, ssid length rule**: This signature matches a specified SSID or SSID length. It is mandatory to configure the frame type to match for this signature. When configured, only frame types allowed are beacons, probe requests, and probe responses. Example rule: `ssid : AirJack and frame type beacon : Signature for AirJack attack.`
• payload rule: This signature matches a particular payload at a particular frame offset. You can restrict these
matches based on frame type. Example rule: Payload : 0x00601d Offset 3 : Netstumbler

• address-match rule: This signature matches one or more address fields. The address fields supported are
BSSID, source-MAC, and destination-MAC. You can also specify frame types to match. The frame types
supported are assoc, auth, beacon, data, deauth, disassoc, mgmt, probe-request, and probe-response.

A WIPS policy, once configured, has to be attached to a RF Domain to take effect. Multiple WIPS policies can be
configured at the same time, but only one policy can be attached to a given RF Domain at any time.

NOTE: To attach a WIPS policy to a RF Domain, in the RF Domain
configuration mode, execute the use > wips-policy <WIPS-POLICY-NAME>
command. For more information, see use.

NOTE: With this most recent release, AP7522 and AP7532 model Access
Points can provide enhanced sensor support. AP7522 and AP7532 sensors
can send data from off-channel-scans while in radio-share promiscuous/inline
mode, in addition to the on-channel data captured in radio-share mode. ADSP
uses the off-channel-scan data (in addition to the on-channel data) to monitor
for rogue intrusions and trigger alarms. OTA Termination is triggered from
ADSP to the appropriate radio-share AP to initiate termination.

NOTE: AP7522 and AP7532 models also support shared part-time scanning
using WIPS in WiNG (using off-channel-scans) and no ADSP. WIPS on WiNG
was enhanced to add rogue detection/classification (wired side detection based
of MAC Address Offset) and over-the-air (OTA) termination for AP7522 and
AP7532 deployments.

Use the (config) instance to configure WIPS policy commands. To navigate to the WIPS policy instance, use the
following commands:

<DEVICE>(config)#wips-policy <POLICY-NAME>

rfs7000-37FABE(config)#wips-policy test
rfs7000-37FABE(config-wips-policy-test)#?

WIPS Policy Mode commands:
ap-detection               Rogue AP detection
enable                     Enable this wips policy
event                      Configure an event
history-throttle-duration  Configure the duration for which event duplicates
                          are not stored in history
interference-event         Specify events which will contribute to smart-rf
                          wifi interference calculations
no                         Negate a command or set its defaults
signature                  Signature to configure
use                        Set setting to use
clrscr                     Clears the display screen
commit                     Commit all changes made in this session
do                         Run commands from Exec mode
end                         End current mode and change to EXEC mode
exit                        End current mode and down to previous mode
help                       Description of the interactive help system
revert                     Revert changes
service                    Service Commands
show                       Show running system information
write                      Write running configuration to memory or terminal

rfs7000-37FABE(config-wips-policy-test)#
NOTE: The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
20.1 wips-policy

The following table summarizes WIPS policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap-detection</td>
<td>Defines the WIPS AP detection configuration</td>
<td>page 20-5</td>
</tr>
<tr>
<td>enable</td>
<td>Enables a WIPS policy</td>
<td>page 20-7</td>
</tr>
<tr>
<td>event</td>
<td>Configures events</td>
<td>page 20-8</td>
</tr>
<tr>
<td>history-throttle-duration</td>
<td>Configures the duration event duplicates are omitted from the event history</td>
<td>page 20-12</td>
</tr>
<tr>
<td>interference-event</td>
<td>Specifies events contributing to the Smart RF WiFi interference calculations</td>
<td>page 20-13</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 20-14</td>
</tr>
<tr>
<td>signature</td>
<td>Configures a WIPS policy signature and enters its configuration mode</td>
<td>page 20-16</td>
</tr>
<tr>
<td>use</td>
<td>Defines a WIPS policy settings</td>
<td>page 20-32</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
20.1.1 *ap-detection*

> **wips-policy**

Enables the detection of unauthorized or unsanctioned APs. Unauthorized APs are untrusted access points connected to an access point managed network. These untrusted APs accept wireless client associations. It is important to detect such rogue APs and declare them unauthorized. Rogue AP detection is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ap-detection {age-out | air-termination | interferer-threshold | recurring-event-interval | wait-time}
ap-detection {age-out <30-86400> | interferer-threshold <-100--10> | recurring-event-interval <0-10000> | wait-time <10-600>}
ap-detection air-termination {allow-channel-switch | mode [auto | manual]}
```

**Parameters**

- **ap-detection**
  - `age-out <30-86400>`
    - Configures the unauthorized AP ageout interval. The WIPS policy uses this value to ageout unauthorized APs.
    - `<30-86400>` – Sets an ageout interval from 30 - 86400 seconds. The default is 5 minutes (300 seconds).
  - `recurring-event-interval <0-10000>`
    - Configures recurring event interval help of unauthorized APs
    - `<0-10000>` – Configures the recurring interval between 0 - 10000 seconds. The default is 300 seconds.
  - `interferer-threshold <-100--10>`
    - Configures RSSI threshold value to determine if an unsanctioned ap is an interferer or not
    - `<-100--10>` – Configures the rssi threshold between -100 - -10 dBm. The default is -75 dBm.
  - `wait-time <10-600>`
    - Configures the wait time before a detected AP is declared as unauthorized and potentially removed
    - `<10-600>` – Sets a wait time from 10 - 600 seconds. The default is 1 minute (60 seconds).

- **ap-detection air-termination**
  - `allow-channel-switch`
  - `mode [auto | manual]`

  Enables air termination of unauthorized APs. This option is disabled by default.
  - `allow-channel-switch` – Optional. Allows channel switch of unauthorized APs based on the channel mode. This option is disabled by default.
  - `mode [auto | manual]` – Optional. Select the mode as auto or manual to configure. The default setting is manual.
Examples

rfs7000-37FABE(config-wips-policy-test)#ap-detection wait-time 15
rfs7000-37FABE(config-wips-policy-test)#ap-detection age-out 50

rfs7000-37FABE(config-wips-policy-test)#show context
wips-policy test
  ap-detection-age-out 50
  ap-detection-wait-time 15
rfs7000-37FABE(config-wips-policy-test)#

nx4500-5CFA8E(config-wips-policy-test)#ap-detection recurring-event-interval 10
nx4500-5CFA8E(config-wips-policy-test)#show context
wips-policy test
  ap-detection recurring-event-interval 10
nx4500-5CFA8E(config-wips-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets unauthorized or unsanctioned AP detection settings to default</td>
</tr>
</tbody>
</table>
20.1.2 **enable**

* **wips-policy**

Enables this WIPS policy

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6510, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```enable```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-wips-policy-test)#enable
rfs7000-37FABE(config-wips-policy-test)#
```
20.1.3 event

`wips-policy`

Configures events, filters and threshold values for this WIPS policy. Events are grouped into three categories, AP anomaly, client anomaly, and excessive. WLANs are baselined for matching criteria. Any deviation from this baseline is considered an anomaly and logged as an event.

---

**NOTE:** By default all event monitoring is disabled.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
event [ap-anomaly|client-anomaly|enable-all-events|excessive]
event ap-anomaly [ad-hoc-violation|airjack|ap-ssid-broadcast-in-beacon|asleap|
impersonation-attack|null-probe-response|transmitting-device-using-invalid-mac|
unencrypted-wired-leakage|wireless-bridge]
event client-anomaly [dos-broadcast-deauth|fuzzing-all-zero-macs|
fuzzing-invalid-frame-type|fuzzing-invalid-mgmt-frames|fuzzing-invalid-seq-num|
identical-src-and-dest-addr|invalid-8021x-frames|netstumbler-generic|
non-conforming-data|wellenreiter] {filter-ageout <0-86400>}
event enable-all-events
event excessive [80211-replay-check-failure|aggressive-scanning|auth-server-failures|
decryption-failures|dos-assoc-or-auth-flood|dos-eapol-start-storm|
dos-unicast-deauth-or-disassoc|eap-flood|eap-nak-flood|frames-from-unassoc-station|
{filter-ageout <0-86400>|threshold-client <0-65535>|threshold-radio <0-65535>}
```

**Parameters**

- **event ap-anomaly [ad-hoc-violation|airjack|ap-ssid-broadcast-in-beacon|asleap|
im impersonation-attack|null-probe-response|transmitting-device-using-invalid-mac|
unencrypted-wired-leakage|wireless-bridge]**

<table>
<thead>
<tr>
<th>ap-anomaly</th>
<th>Enables AP anomaly event tracking</th>
</tr>
</thead>
<tbody>
<tr>
<td>ad-hoc-violation</td>
<td>Tracks ad-hoc network violations</td>
</tr>
<tr>
<td>airjack</td>
<td>Tracks AirJack attacks</td>
</tr>
<tr>
<td>ap-ssid-broadcast-in-beacon</td>
<td>Tracks AP SSID broadcasts in beacon events</td>
</tr>
<tr>
<td>asleap</td>
<td>Tracks ASLEAP attacks. These attacks break <strong>Lightweight Extensible Authentication Protocol (LEAP)</strong> passwords</td>
</tr>
<tr>
<td>impersonation-attack</td>
<td>Tracks impersonation attacks. These are also referred to as spoofing attacks, where the attacker assumes the address of an authorized device.</td>
</tr>
</tbody>
</table>
null-probe-response | Tracks null probe response attacks  
transmitting-device-using-invalid-mac | Tracks the transmitting device using an invalid MAC attacks  
unencrypted-wired-leakage | Tracks unencrypted wired leakage  
wireless-bridge | Tracks *wireless bridge* (WDS) frames  


- `client-anomaly` Enables client anomaly event tracking  
These are suspicious events performed by wireless clients compromising the security of the network. An administrator can enable or disable filtering of each listed event and set the thresholds required for the generation of the event notification and filtering action applied.  

- `dos-broadcast-deauth` Tracks DoS broadcast deauthentication events  
- `fuzzing-all-zero-macs` Tracks Fuzzing: All zero MAC addresses observed  
- `fuzzing-invalid-frame-type` Tracks Fuzzing: Invalid frame type detected  
- `fuzzing-invalid-mgmt-frames` Tracks Fuzzing: Invalid management frame detected  
- `fuzzing-invalid-seq-num` Tracks Fuzzing: Invalid sequence number detected  
- `identical-src-and-dest_addr` Tracks identical source and destination addresses detection  
- `invalid-8021x-frames` Tracks Fuzzing: Invalid 802.1x frames detected  
- `netstumbler-generic` Tracks Netstumbler (v3.2.0, 3.2.3, 3.3.0) events  
- `non-conforming-data` Tracks non conforming data packets  
- `wellenreiter` Tracks Wellenreiter events  

- `filter-ageout <0-86400>` The following keywords are common to all of the above client anomaly events:  
  - `filter-ageout <0-86400>` – Optional. Configures the filter expiration interval in seconds  
  - `<0-86400>` – Sets the filter ageout interval from 0 - 86400 seconds. The default is 0 seconds.  

*Note:* For each violation define a filter time in seconds, which determines how long the packets (received from an attacking device) are ignored once a violation has been triggered. Ignoring frames from an attacking device minimizes the effectiveness of the attack and the impact to the site until permanent mitigation can be performed.  

*Note:* The filter ageout value is applicable across the entire RF Domain using this WIPS policy. If an MU is detected performing an attack and is filtered by one of the APs, the information is passed on to all APs and controllers within the RF Domain through the domain manager. Consequently the MU is filtered, for the specified period of time, across all devices.
- `event enable-all-events`  
  Enables tracking of all intrusion events (client anomaly and excessive events)


<table>
<thead>
<tr>
<th>excessive</th>
<th>Enables the tracking of excessive events. Excessive events are actions performed continuously and repetitively. These events can impact the performance of the controller managed network. DoS attacks come under this category.</th>
</tr>
</thead>
<tbody>
<tr>
<td>80211-replay-check-failure</td>
<td>Tracks 802.11 replay check failure</td>
</tr>
<tr>
<td>aggressive-scanning</td>
<td>Tracks aggressive scanning events</td>
</tr>
<tr>
<td>auth-server-failures</td>
<td>Tracks failures reported by authentication servers</td>
</tr>
<tr>
<td>decryption-failures</td>
<td>Tracks decryption failures</td>
</tr>
<tr>
<td>dos-assoc-or-auth-flood</td>
<td>Tracks DoS association or authentication floods</td>
</tr>
<tr>
<td>dos-eapol-start-storm</td>
<td>Tracks DoS EAPOL start storms</td>
</tr>
<tr>
<td>dos-unicast-deauth-or-disassoc</td>
<td>Tracks DoS dissociation or deauthentication floods</td>
</tr>
<tr>
<td>eap-flood</td>
<td>Tracks EAP floods</td>
</tr>
<tr>
<td>eap-nak-flood</td>
<td>Tracks EAP NAK floods</td>
</tr>
<tr>
<td>frames-from-unassoc-station</td>
<td>Tracks frames from unassociated clients</td>
</tr>
</tbody>
</table>
| filter-ageout <0-86400> | The following keywords are common to all excessive events:  
  - filter-ageout <0-86400> – Optional. Configures a filter expiration interval in seconds. It sets the duration for which the client is filtered. The client is added to a ACL as a special entry and frames received from this client are dropped.  
  - <0-86400> – Sets a filter ageout interval from 0 - 86400 seconds. The default is 0 seconds.  
  **Note**: This value is applicable across the RF Domain. If a client is detected performing an attack and is filtered by one of the APs, the information is passed to the domain controller. The domain controller then propagates this information to all APs and wireless controllers in the RF Domain. |
| threshold-client <0-65535> | The following keywords are common to all excessive events:  
  - threshold-client <0-65535> – Optional. Configures a client threshold value after which the filter is triggered and an event is recorded  
  - <0-65535> – Sets a wireless client threshold value from 0 - 65535 seconds |
| threshold-radio <0-65535> | The following keywords are common to all excessive events:  
  - threshold-radio <0-65535> – Optional. Configures a radio threshold value after which the filter is triggered and an event is recorded  
  - <0-65535> – Sets a radio threshold value from 0 - 65535 seconds |
Examples

rfs7000-37FABE(config-wips-policy-test)#event excessive 80211-replay-check-failure
filter-ageout 9 threshold-client 8 threshold-radio 99

rfs7000-37FABE(config-wips-policy-test)#show context
wips-policy test
  event excessive 80211-replay-check-failure threshold-client 10 threshold-radio 99
  filter-ageout 9
  event client-anomaly wellenreiter filter-ageout 99
  ap-detection-ageout 50
  ap-detection-wait-time 15
rfs7000-37FABE(config-wips-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables WIPS policy events tracking</td>
</tr>
</tbody>
</table>
20.1.4 history-throttle-duration

wips-policy

Configures the duration event duplicates are omitted from the event history

The system maintains a history of all events that have occurred, on each device, within a RF Domain. Sometimes an event occurs for a prolonged period of time and tends to fill up the event history list. In such a scenario, duplicate information added to the event history list can be throttled for a specified period of time. Once this period is over, duplicate entries are once again allowed.

Event history statistics are periodically sent to the domain manager, which can be queried to ascertain the general health of the domain.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

history-throttle-duration <30-86400>

Parameters

- history-throttle-duration <30-86400>

Examples

rfs7000-37FABE(config-wips-policy-test)#history-throttle-duration 77

rfs7000-37FABE(config-wips-policy-test)#show context
wips-policy test
history-throttle-duration 77
  event excessive 80211-replay-check-failure threshold-client 10 threshold-radio 99
  filter-ageout 9
  event client-anomaly wellenreiter filter-ageout 99
  ap-detection-ageout 50
  ap-detection-wait-time 15
rfs7000-37FABE(config-wips-policy-test)#

Related Commands

no

Resets the history throttle duration to its default (120 seconds)
20.1.5 interference-event

Specifies events contributing to the Smart RF WiFi interference calculations

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

interference-event [non-conforming-data|wireless-bridge]

Parameters

- interference-event [non-conforming-data|wireless-bridge]

<table>
<thead>
<tr>
<th>non-conforming-data</th>
<th>Considers non conforming data packets when calculating Smart RF interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>wireless-bridge</td>
<td>Considers Wireless Bridge (WDS) frames when calculating Smart RF interference</td>
</tr>
</tbody>
</table>

Examples

r7000-37FABE(config-wips-policy-test)#interference-event non-conforming-data
r7000-37FABE(config-wips-policy-test)#show context
wips-policy test
  history-throttle-duration 77
  event excessive 80211-replay-check-failure threshold-client 10 threshold-radio 99
  filter-ageout 9
  event client-anomaly wellenreiter filter-ageout 99
  interference-event non-conforming-data
  ap-detection-ageout 50
  ap-detection-wait-time 15
r7000-37FABE(config-wips-policy-test)#

Related Commands

no
  Disables this WIPS policy signature as a Smart RF interference source
20.1.6 no

Negates a command or resets configured settings to their default. When used in the config WIPS policy mode, the no command negates or resets filters and thresholds.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9510, NX9500, NX9600

Syntax

no [ap-detection|enable|event|history-throttle-duration|interference-event|
signature|use]

no [enable|history-throttle-duration]

no ap-detection {ageout {<LINE-SINK>}}|air-termination|interferer-threshold <-100--10>|recurring-event-interval <0-10000>wait-time {<LINE-SINK>})

no event [ap-anomaly|client-anomaly|enable-all-events|excessive]


no interference-event [non-conforming-data|wireless-bridge]

no signature <WIPS-SIGNATURE>

no use device-categorization

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Negates a command or resets configured settings to their default. When used in the config WIPS policy mode, the no command negates or resets filters and thresholds. |

Usage Guidelines

The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.
Examples

The following example shows the WIPS Policy ‘test’ settings before the ‘no’ commands are executed:

```
rrfs7000-37FABE(config-wips-policy-test)#show context
wips-policy test
  history-throttle-duration 77
  event excessive 80211-replay-check-failure threshold-client 10 threshold-radio 99
  filter-ageout 9
  event client-anomaly wellenreiter filter-ageout 99
  interference-event non-conforming-data
  ap-detection-ageout 50
  ap-detection-wait-time 15
rrfs7000-37FABE(config-wips-policy-test)#
```

```
rrfs7000-37FABE(config-wips-policy-test)#no event client-anomaly wellenreiter
rrfs7000-37FABE(config-wips-policy-test)#no interference-event non-conforming-data
```

The following example shows the WIPS Policy ‘test’ settings after the ‘no’ commands are executed:

```
rrfs7000-37FABE(config-wips-policy-test)#show context
wips-policy test
  event excessive 80211-replay-check-failure threshold-client 10 threshold-radio 99
  filter-ageout 9
  no event client-anomaly wellenreiter filter-ageout 99
  ap-detection-ageout 50
  ap-detection-wait-time 15
rrfs7000-37FABE(config-wips-policy-test)#
```
20.1.7 signature

- **wips-policy**

  Attack and intrusion patterns are identified and configured as signatures in a WIPS policy. The WIPS policy compares packets in the network with pre configured signatures to identify threats.

  The following table summarizes WIPS policy signature configuration commands:

  **Table 20.2 WIPS-Policy-Signature-Config Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>signature</td>
<td>Configures a WIPS policy signature and enters its configuration mode</td>
<td>20-17</td>
</tr>
<tr>
<td>signature mode commands</td>
<td>Summarizes WIPS signature configuration mode commands</td>
<td>20-19</td>
</tr>
</tbody>
</table>
20.1.7.1 signature

Configures a WIPS policy signature. A WIPS signature is the set of parameters or patterns used by WIPS to identify and categorize particular sets of attack behaviors in order to classify them.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
signature <SIGNATURE-NAME>
```

Parameters

- signature <SIGNATURE-NAME>

Examples

```
rfs7000-37FABE(config-wips-policy-test)#signature test
rfs7000-37FABE(config-test-signature-test)#
```

Wips Signature Mode commands:

- `bssid` Bssid mac address
- `dst-mac` Destination mac address
- `filter-ageout` Configure filter ageout
- `frame-type` Configure frame-type to match
- `interference-event` Signature is a smart-rf interference source
- `mode` Enable/Disable signature
- `no` Negate a command or set its defaults
- `payload` Configure a payload
- `src-mac` Source mac address
- `ssid-match` Match based on ssid
- `threshold-client` Configure client threshold limit
- `threshold-radio` Configure radio threshold limit
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
rfs7000-37FABE(config-test-signature-test)#
```
rfs7000-37FABE(config-wips-policy-test)#show context
wips-policy test
  event excessive 80211-replay-check-failure threshold-client 10 threshold-radio 99
  filter-ageout 9
no event client-anomaly wellenreiter filter-ageout 99
  signature test
    interference-event
    bssid 11-22-33-44-55-66
    dst-mac 55-66-77-88-99-00
    frame-type reassoc
    filter-ageout 8
    threshold-client 88
    payload 1 pattern test offset 1
    ap-detection-ageout 50
    ap-detection-wait-time 15
rfs7000-37FABE(config-wips-policy-test)#

| no                  | Deletes a WIPS policy signature |
20.1.7.2 signature mode commands

The following table summarizes WIPS policy signature configuration mode commands:

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>bssid</td>
<td>Configures the BSSID MAC address</td>
<td>page 20-20</td>
</tr>
<tr>
<td>dst-mac</td>
<td>Configures the destination MAC address</td>
<td>page 20-21</td>
</tr>
<tr>
<td>filter-ageout</td>
<td>Configures the filter ageout interval</td>
<td>page 20-22</td>
</tr>
<tr>
<td>frame-type</td>
<td>Configures the frame type used for matching</td>
<td>page 20-23</td>
</tr>
<tr>
<td>interference-event</td>
<td>Configures this WIPS policy signature as the Smart RF interference source</td>
<td>page 20-24</td>
</tr>
<tr>
<td>mode</td>
<td>Enables the signature mode</td>
<td>page 20-25</td>
</tr>
<tr>
<td>payload</td>
<td>Configures payload settings</td>
<td>page 20-26</td>
</tr>
<tr>
<td>src-mac</td>
<td>Configures the source MAC address</td>
<td>page 20-27</td>
</tr>
<tr>
<td>ssid-match</td>
<td>Configures a match based on SSID</td>
<td>page 20-28</td>
</tr>
<tr>
<td>threshold-client</td>
<td>Configures the wireless client threshold limit</td>
<td>page 20-29</td>
</tr>
<tr>
<td>threshold-radio</td>
<td>Configures the radio threshold limit</td>
<td>page 20-30</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 20-31</td>
</tr>
</tbody>
</table>
20.1.7.2.1 **bssid**

*signature mode commands*

Configures a BSSID MAC address with this WIPS signature for matching

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`bssid <MAC>`

**Parameters**

- `bssid <MAC>`

<table>
<thead>
<tr>
<th>bssid &lt;MAC&gt;</th>
<th>Configures a BSSID MAC address to match</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MAC&gt; – Specify the MAC address.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-test-signature-test)#bssid 11-22-33-44-55-66
rfs7000-37FABE(config-test-signature-test)#show context signature test
bssid 11-22-33-44-55-66
rfs7000-37FABE(config-test-signature-test)#
```

**Related Commands**

- `no` Disables a WIPS signature BSS ID
20.1.7.2.2 dst-mac

- **signature mode commands**

Configures a destination MAC address for the packet examined for matching

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

dst-mac <MAC>

**Parameters**

- dst-mac <MAC>

<table>
<thead>
<tr>
<th>dst-mac &lt;MAC&gt;</th>
<th>Configures a destination MAC address to match</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MAC&gt;</td>
<td>Specify the destination MAC address.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-test-signature-test)#dst-mac 55-66-77-88-99-00

rfs7000-37FABE(config-test-signature-test)#show context signature test
  bssid 11-22-33-44-55-66
dst-mac 55-66-77-88-99-00
rfs7000-37FABE(config-test-signature-test)#

**Related Commands**

- **no** Disables a WIPS signature destination MAC address
20.1.7.2.3 filter-ageout

Configures the filter ageout interval in seconds. This is the duration a client, triggering a WIPS event, is excluded from RF Domain manager radio association.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
filter-ageout <1-86400>
```

Parameters

- `filter-ageout <1-86400>`

Examples

```
rfs7000-37FABE(config-test-signature-test)#filter-ageout 8
rfs7000-37FABE(config-test-signature-test)#show context signature test
  bssid 11-22-33-44-55-66
  dst-mac 55-66-77-88-99-00
rfs7000-37FABE(config-test-signature-test)#
```

Related Commands

- `no`
  Removes the configured filter ageout interval
20.1.7.2.4 frame-type

**signature mode commands**

Configures the frame type used for matching with this WIPS policy signature.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
frame-type [all|assoc|auth|beacon|data|deauth|disassoc|mgmt|probe-req|probe-resp|reassoc]
```

**Parameters**

- `frame-type [all|assoc|auth|beacon|data|deauth|disassoc|mgmt|probe-req|probe-resp|reassoc]`

<table>
<thead>
<tr>
<th>frame-type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>Configures all frame type matching</td>
</tr>
<tr>
<td>assoc</td>
<td>Configures association frame matching</td>
</tr>
<tr>
<td>auth</td>
<td>Configures authentication frame matching</td>
</tr>
<tr>
<td>beacon</td>
<td>Configures beacon frame matching</td>
</tr>
<tr>
<td>data</td>
<td>Configures data frame matching</td>
</tr>
<tr>
<td>deauth</td>
<td>Configures deauthentication frame matching</td>
</tr>
<tr>
<td>disassoc</td>
<td>Configures disassociation frame matching</td>
</tr>
<tr>
<td>mgmt</td>
<td>Configures management frame matching</td>
</tr>
<tr>
<td>probe-req</td>
<td>Configures probe request frame matching</td>
</tr>
<tr>
<td>probe-resp</td>
<td>Configures probe response frame matching</td>
</tr>
<tr>
<td>reassoc</td>
<td>Configures re-association frame matching</td>
</tr>
</tbody>
</table>

**Usage Guidelines**
The frame type configured determines the SSID match type configured. To configure the SSID match type as SSID, the frame type must be beacon, probe-req or probe-resp.

**Examples**

```
rfs7000-37FABE(config-test-signature-test)#frame-type reassoc
rfs7000-37FABE(config-test-signature-test)#show context signature test
bssid 11-22-33-44-55-66
dst-mac 55-66-77-88-99-00
frame-type reassoc
filter-ageout 8
rfs7000-37FABE(config-test-signature-test)#
```

**Related Commands**

- `no` Resets a WIPS signature frame type
20.1.7.2.5 interference-event

**signature mode commands**

Configures this WIPS policy signature as Smart RF interference source

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

interference-event

**Parameters**

None

**Examples**

```
  rfs7000-37FABE(config-test-signature-test)#interference-event
  rfs7000-37FABE(config-test-signature-test)#show context signature test interference-event bssid 11-22-33-44-55-66 dst-mac 55-66-77-88-99-00 frame-type reassoc filter-ageout 8
  rfs7000-37FABE(config-test-signature-test)#
```

**Related Commands**

| no | Disables this WIPS policy signature as Smart RF interference source |
20.1.7.2.6 mode

**signature mode commands**

Enables a WIPS policy signature

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

mode enable

**Parameters**

- mode enable

<table>
<thead>
<tr>
<th>mode enable</th>
<th>Enables this WIPS signature</th>
</tr>
</thead>
</table>

**Examples**

rfs7000-37FABE(config-test-signature-test)#mode enable
rfs7000-37FABE(config-test-signature-test)#

**Related Commands**

- **no** Enables a WIPS signature
**20.1.7.2.7 payload**

*signature mode commands*

Configures payload settings. The payload command sets a numerical index pattern and offset for this WIPS signature.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`payload <1-3> pattern <WORD> offset <0-255>`

**Parameters**

<table>
<thead>
<tr>
<th>payload &lt;1-3&gt;</th>
<th>Configures payload settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>pattern &lt;WORD&gt;</td>
<td>Specifies the pattern to match: hex or string</td>
</tr>
<tr>
<td>offset &lt;0-255&gt;</td>
<td>Specifies the payload offset to start the pattern match</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-test-signature-test)#payload 1 pattern test offset 1
rfs7000-37FABE(config-test-signature-test)#show context
signature test
  bssid 11-22-33-44-55-66
  dst-mac 55-66-77-88-99-00
  frame-type assoc
  filter-ageout 8
  payload 1 pattern test offset 1
rfs7000-37FABE(config-test-signature-test)#
```

**Related Commands**

| no | Removes payload and associated settings |
20.1.7.2.8 src-mac

*signature mode commands*

Configures a source MAC address for a packet examined for matching

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```bash
src-mac <MAC>
```

**Parameters**

- `src-mac <MAC>`

  - `src-mac <MAC>`

    Configures the source MAC address to match

    - `<MAC>` – Specify the source MAC address.

**Examples**

```bash
rfs7000-37FABE(config-test-signature-test)#src-mac 00-1E-E5-EA-1D-60
rfs7000-37FABE(config-test-signature-test)#show context signature test
  bssid 11-22-33-44-55-66
  src-mac 00-1E-E5-EA-1D-60
  dst-mac 55-66-77-88-99-00
  frame-type assoc
  filter-ageout 8
  payload 1 pattern test offset 1
rfs7000-37FABE(config-test-signature-test)#
```

**Related Commands**

- `no`

  Removes a WIPS signature source MAC address
20.1.7.2.9 ssid-match

signature mode commands

Configures the SSID (and its character length) used for matching

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

ssid-match [ssid|ssid-len]

ssid-match [ssid <SSID>|ssid-len <0-32>]

Parameters
- ssid-match [ssid <SSID>|ssid-len <0-32>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ssid &lt;SSID&gt;</td>
<td>Specifies the SSID match string</td>
</tr>
<tr>
<td></td>
<td>• &lt;SSID&gt; – Specify the SSID string.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Specify the correct SSID to ensure proper filtering.</td>
</tr>
<tr>
<td>ssid-len &lt;0-32&gt;</td>
<td>Specifies the length of the SSID</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-32&gt; – Specify the SSID length from 0 - 32 characters.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-test-signature-test)#ssid-match ssid PrinterLan

rfs7000-37FABE(config-test-signature-test)#show context
signature test
bssid 11-22-33-44-55-66
src-mac 00-1E-E5-EA-1D-60
dst-mac 55-66-77-88-99-00
frame-type beacon
ssid-match ssid PrinterLan
filter-ageout 8
payload 1 pattern test offset 1
rfs7000-37FABE(config-test-signature-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the configured SSID</td>
</tr>
</tbody>
</table>
20.1.7.2.10 threshold-client

*signature mode commands*

Configures the wireless client threshold limit. When the wireless client exceeds the specified limit, an event is triggered.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`threshold-client <1-65535>`

**Parameters**

- `threshold-client <1-65535>`

**Examples**

```
rfs7000-37FABE(config-test-signature-test)#threshold-client 88
rfs7000-37FABE(config-test-signature-test)#show context signature test
  bssid 11-22-33-44-55-66
  src-mac 00-1E-E5-EA-1D-60
  dst-mac 55-66-77-88-99-00
  frame-type beacon
  ssid-match ssid PrinterLan
  filter-ageout 8
  threshold-client 88
  payload 1 pattern test offset 1
rfs7000-37FABE(config-test-signature-test)#
```

**Related Commands**

| `no` | Removes the wireless client threshold limit configured with a WIPS policy signature |
20.1.7.2.11 threshold-radio

► signature mode commands

Configures the radio’s threshold limit. When the radio exceeds the specified limit, an event is triggered.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510

Syntax

threshold-radio <1-65535>

Parameters

- threshold-radio <1-65535>

| threshold-radio <1-65535> | Configures the radio’s threshold limit
|---------------------------|----------------------------------------|
|                           | • <1-65535> – Specify the threshold limit for a 60 second window from 1 - 65535.

Examples

rfs7000-37FABE(config-test-signature-test)#threshold-radio 88

rfs7000-37FABE(config-test-signature-test)#show context
signature test
  bssid 11-22-33-44-55-66
  src-mac 00-1E-E5-EA-1D-60
  dst-mac 55-66-77-88-99-00
  frame-type beacon
  ssid-match ssid PrinterLan
  filter-ageout 8
  threshold-client 88
  threshold-radio 88
  payload 1 pattern test offset 1

rfs7000-37FABE(config-test-signature-test)#

Related Commands

- no

  Removes the radio’s threshold limit configured with a WIPS policy signature
20.1.7.2.12 no

**signature mode commands**

Negates a command or resets settings to their default. When used in the config WIPS policy signature mode, the `no` command resets or removes WIPS signature settings.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no [bssid|dst-mac|filter-ageout|frame-type|interference-event|mode|payload|src-mac|
    ssid-match|threshold-client|threshold-radio]

no [bssid|dst-mac|filter-ageout|frame-type|interference-event|mode enable|
    payload <1-3>|src-mac|ssid-match [ssid|ssid-len]|threshold-client|threshold-radio]
```

**Parameters**

- `no <PARAMETERS>`

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Negates a command or resets settings to their default</th>
</tr>
</thead>
</table>

**Usage Guidelines**

The `no` command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

**Examples**

The following is the WIPS signature 'test' settings before the execution of the 'no' command:

```
rfs7000-37FABE(config-test-signature-test)#show context
signature test
    bssid 11-22-33-44-55-66
    src-mac 00-1E-E5-EA-1D-60
    dst-mac 55-66-77-88-99-00
    frame-type beacon
    ssid-match ssid PrinterLan
    filter-ageout 8
    threshold-client 88
    threshold-radio 88
    payload 1 pattern test offset 1
rfs7000-37FABE(config-test-signature-test)#
```

The following is the WIPS signature 'test' settings after the execution of the 'no' command:

```
rfs7000-37FABE(config-test-signature-test)#no mode enable
rfs7000-37FABE(config-test-signature-test)#no bssid
rfs7000-37FABE(config-test-signature-test)#no dst-mac
rfs7000-37FABE(config-test-signature-test)#no src-mac
rfs7000-37FABE(config-test-signature-test)#no filter-ageout
rfs7000-37FABE(config-test-signature-test)#no threshold-client
rfs7000-37FABE(config-test-signature-test)#no threshold-radio
rfs7000-37FABE(config-test-signature-test)#
    signature test
    no mode enable
    frame-type beacon
    payload 1 pattern test offset 1
rfs7000-37FABE(config-test-signature-test)
```
20.1.8 use

*use device-categorization wips-policy

Enables device categorization on this WIPS policy. This command uses an existing device categorization list. The list categorizes devices as authorized or unauthorized.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

use device-categorization <DEVICE-CATEGORIZATION>

Parameters

- use device-categorization <DEVICE-CATEGORIZATION>

| device-categorization <DEVICE-CATEGORIZATION> | Configures a device categorization list
| --- | ---
| • <DEVICE-CATEGORIZATION> – Specify the device categorization object name to associate with this profile

Examples

rfs7000-37FABE(config-wips-policy-test)#use device-categorization test

rfs7000-37FABE(config-wips-policy-test)#show context
wips-policy test
  event excessive 80211-replay-check-failure threshold-client 10 threshold-radio 99
  filter-ageout 9
  no event client-anomaly wellenreiter filter-ageout 99
  signature test
    interference-event
    bssid 11-22-33-44-55-66
    dst-mac 55-66-77-88-99-00
    frame-type reassoc
    filter-ageout 8
    threshold-client 88
    payload 1 pattern test offset 1
    ap-detection-ageout 50
    ap-detection-wait-time 15
  use device-categorization test
rfs7000-37FABE(config-wips-policy-test)#

Related Commands

| no | Disables the use of a device categorization policy with a WIPS policy |
This chapter summarizes the WLAN QoS policy in the CLI command structure.

A WLAN QoS policy increases network efficiency by prioritizing data traffic. Prioritization reduces congestion. This is essential because of the lack of bandwidth for all users and applications. QoS helps ensure each WLAN on the wireless controller receives a fair share of the overall bandwidth, either equally or as per the proportion configured. Packets directed towards clients are classified into categories such as Video, Voice and Data. Packets within each category are processed based on the weights defined for each WLAN.

Each WLAN QoS policy has a set of parameters which it groups into categories, such as management, voice and data. Packets within each category are processed based on the weights defined for each WLAN.

Use the (config) instance to configure WLAN QoS policy commands. To navigate to the WLAN QoS policy instance, use the following commands:

```
<DEVICE>(config)#wlan-qos-policy <POLICY-NAME>
```

```
rfs7000-37FABE(config)#wlan-qos-policy test
rfs7000-37FABE(config-wlan-qos-test)#?
```

WLAN QoS Mode commands:

- accelerated-multicast: Configure accelerated multicast streams address and forwarding QoS classification
- classification: Select how traffic on this WLAN must be classified (relative prioritization on the radio)
- multicast-mask: Egress multicast mask (frames that match bypass the PSPqueue. This permits intercom mode operation without delay even in the presence of PSP clients)
- no: Negate a command or set its defaults
- qos: Quality of service
- rate-limit: Configure traffic rate-limiting parameters on a per-wlan/per-client basis
-svp-prioritization: Enable spectralink voice protocol support on this wlan
- voice-prioritization: Prioritize voice client over other client (for non-WMM clients)
- wmm: Configure 802.11e/Wireless MultiMedia parameters
- clrscr: Clears the display screen
- commit: Commit all changes made in this session
- do: Run commands from Exec mode
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
- help: Description of the interactive help system
- revert: Revert changes
- service: Service Commands
- show: Show running system information
- write: Write running configuration to memory or terminal
NOTE: The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
21.1 wlan-qos-policy

WLAN QoS configurations differ significantly from QoS policies configured for radios. WLAN QoS configurations are designed to support the data requirements of wireless clients, including the data types they support and their network permissions. Radio QoS policies are specific to the transmit and receive characteristics of the connected radio’s themselves, independent from the wireless clients these access point radios support.

The following table summarizes WLAN QoS policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>accelerated-multicast</td>
<td>Configures accelerated multicast stream addresses and forwards QoS classifications</td>
<td>page 21-4</td>
</tr>
<tr>
<td>classification</td>
<td>Classifies WLAN traffic based on priority</td>
<td>page 21-6</td>
</tr>
<tr>
<td>multicast-mask</td>
<td>Configures the egress prioritization multicast mask</td>
<td>page 21-8</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 21-9</td>
</tr>
<tr>
<td>qos</td>
<td>Defines the QoS configuration</td>
<td>page 21-10</td>
</tr>
<tr>
<td>rate-limit</td>
<td>Configures the WLAN traffic rate limit using a WLAN QoS policy</td>
<td>page 21-11</td>
</tr>
<tr>
<td>svp-prioritization</td>
<td>Enables Spectralink voice protocol support on a WLAN</td>
<td>page 21-14</td>
</tr>
<tr>
<td>voice-prioritization</td>
<td>Prioritizes voice client over other clients</td>
<td>page 21-15</td>
</tr>
<tr>
<td>wmm</td>
<td>Configures 802.11e/wireless multimedia parameters</td>
<td>page 21-16</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
21.1.1 accelerated-multicast

Configures the accelerated multicast stream address and forwarding QoS classification settings.

Enabling this option allows the system to automatically detect and convert multicast streams to unicast streams. When a stream is converted and queued up for transmission, there are a number of classification mechanisms that can be applied to the stream. Use the classification options to specify the traffic type to prioritize.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
accelerated-multicast [<IP>|autodetect]

accelerated-multicast [<IP>|autodetect] {classification [background|best-effort|trust|video|voice]}

Parameters
- accelerated-multicast [<IP>|autodetect] {classification [background|best-effort|trust|video|voice]}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>accelerated-multicast</td>
<td>Configures the accelerated multicast stream address and forwarding QoS classification.</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>Configures a multicast IP address in the A.B.C.D format. The system can configure up to 32 IP addresses for each WLAN QoS policy.</td>
</tr>
<tr>
<td>autodetect</td>
<td>Allows the system to automatically detect multicast streams to be accelerated. This parameter allows the system to convert multicast streams to unicast, or to specify multicast streams converted to unicast.</td>
</tr>
<tr>
<td>classification</td>
<td>Optional. Configures the QoS classification (traffic class) settings. When the stream is converted and queued for transmission, specify the type of classification applied to the stream. The options are: background, best-effort, trust, voice, and video.</td>
</tr>
<tr>
<td>background</td>
<td>Forwards streams with background (low) priority. This parameter is common to both &lt;IP&gt; and autodetect.</td>
</tr>
<tr>
<td>best-effort</td>
<td>Forwards streams with best effort (normal) priority. This parameter is common to both &lt;IP&gt; and autodetect.</td>
</tr>
<tr>
<td>trust</td>
<td>No change to the streams forwarding traffic class. This parameter is common to both &lt;IP&gt; and autodetect.</td>
</tr>
<tr>
<td>video</td>
<td>Forwards streams with video traffic priority. This parameter is common to both &lt;IP&gt; and autodetect.</td>
</tr>
<tr>
<td>voice</td>
<td>Forwards streams with voice traffic priority. This parameter is common to both &lt;IP&gt; and autodetect.</td>
</tr>
</tbody>
</table>
Examples

rfs7000-37FABE(config-wlan-qos-test)#accelerated-multicast autodetect classification voice

rfs7000-37FABE(config-wlan-qos-test)#show context wlan-qos-policy test
  qos trust dscp
  qos trust wmm
  accelerated-multicast autodetect classification voice
rfs7000-37FABE(config-wlan-qos-test)#
21.1.2 classification

Specifies how traffic on this WLAN is classified. This classification is based on relative prioritization on the radio.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
```
classification [low|non-unicast|non-wmm|normal|video|voice|wmm]
classification [low|normal|video|voice|wmm]
classification non-unicast [voice|video|normal|low|default]
classification non-wmm [voice|video|normal|low]
```

Parameters
- classification [low|normal|video|voice|wmm]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>Optimized for background traffic. Implies all traffic on this WLAN is low priority on the radio</td>
</tr>
<tr>
<td>normal</td>
<td>Optimized for best effort traffic. Implies all traffic on this WLAN is prioritized as best effort traffic on the radio</td>
</tr>
<tr>
<td>video</td>
<td>Optimized for video traffic. Implies all traffic on this WLAN is prioritized as video traffic on the radio</td>
</tr>
<tr>
<td>voice</td>
<td>Optimized for voice traffic. Implies all traffic on this WLAN is prioritized as voice traffic on the radio</td>
</tr>
<tr>
<td>wmm</td>
<td>Uses WMM based classification, using DSCP or 802.1p tags, to classify traffic into different queues. Implies WiFi Multimedia QoS extensions are enabled on this radio. This allows different traffic streams between the wireless client and the access point to be prioritized according to the type of traffic (voice, video etc). The WMM classification supports high throughput data rates required for 802.11n device support. This is the default setting.</td>
</tr>
</tbody>
</table>

- classification non-unicast [voice|video|normal|low|default]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-unicast</td>
<td>Optimized for non-unicast traffic. Implies all traffic on this WLAN is designed for broadcast or multiple destinations</td>
</tr>
<tr>
<td>video</td>
<td>Optimized for non-unicast video traffic. Implies all WLAN non-unicast traffic is classified and treated as video packets</td>
</tr>
<tr>
<td>voice</td>
<td>Optimized for non-unicast voice traffic. Implies all WLAN non-unicast traffic is classified and treated as voice packets</td>
</tr>
<tr>
<td>normal</td>
<td>Optimized for non-unicast best effort traffic. Implies all WLAN non-unicast traffic is classified and treated as normal priority packets (best effort).</td>
</tr>
</tbody>
</table>
### Classification Non-WMM

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>low</code></td>
<td>Optimized for non-unicast background traffic. Implies all WLAN non-unicast traffic is classified and treated as low priority packets (background)</td>
</tr>
<tr>
<td><code>default</code></td>
<td>Uses the default classification mode (same as unicast classification if WMM is disabled, normal if unicast classification is WMM). This is the default setting.</td>
</tr>
</tbody>
</table>

- `classification non-wmm [voice|video|normal|low]`

#### Examples

```
rfs7000-37FABE(config-wlan-qos-test)#classification wmm
rfs7000-37FABE(config-wlan-qos-test)#classification non-wmm video
rfs7000-37FABE(config-wlan-qos-test)#classification non-unicast normal
```

```
rfs7000-37FABE(config-wlan-qos-test)#show context
wlan-qos-policy test
  classification non-wmm video
classification non-unicast normal
  qos trust dscp
  qos trust wmm
  accelerated-multicast autodetect classification voice
```

rfs7000-37FABE(config-wlan-qos-test)#
21.1.3 multicast-mask

- **wlan-qos-policy**

Configures an egress prioritization multicast mask for this WLAN QoS policy

Normally all multicast and broadcast packets are buffered until the periodic DTIM interval (indicated in the 802.11 beacon frame), when clients in power save mode wake to check for frames. However, for certain applications and traffic types, the administrator may want the frames transmitted immediately, without waiting for the DTIM interval. By configuring a primary or secondary prioritization multicast mask, the network administrator can indicate which packets are transmitted immediately.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`multicast-mask [primary|secondary] <MAC/MASK>`

**Parameters**

- `multicast-mask [primary|secondary] <MAC/MASK>`

| primary | <MAC/MASK> | Configures the primary egress prioritization multicast mask
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;MAC/MASK&gt;</code></td>
<td>– Provide the MAC address and the mask in the AA-BB-CC-DD-EE-FF /XX-XX-XX-XX-XX-XX format. The default value is 00-00-00-00-00-00/FF-FF-FF-FF-FF-FF.</td>
<td></td>
</tr>
<tr>
<td><strong>Note</strong>: Setting masks is optional and only needed if there are traffic types requiring special handling.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| secondary | <MAC/MASK> | Configures the secondary egress prioritization multicast mask
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;MAC/MASK&gt;</code></td>
<td>– Provide the MAC address and the mask in the AA-BB-CC-DD-EE-FF /XX-XX-XX-XX-XX-XX format. The default value is 00-00-00-00-00-00/FF-FF-FF-FF-FF-FF.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-wlan-qos-test)#multicast-mask primary 11-22-33-44-55-66/22-33-44-55-66-77
```
21.1.4 no

Negates a command or resets settings to their default

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax


Examples

The following example shows the WLAN QoS Policy ‘test’ settings before the ‘no’ commands are executed:

```
rfs7000-37FABE(config-wlan-qos-test)#show context
wlan-qos-policy test
  classification non-wmm video
  multicast-mask primary 11-22-33-44-55-66/22-33-44-55-66-77
  classification non-unicast normal
  qos trust dscp
  qos trust wmm
  accelerated-multicast autodetect classification voice
rfs7000-37FABE(config-wlan-qos-test)#
```

The following example shows the WLAN QoS Policy ‘test’ settings after the ‘no’ commands are executed:

```
rfs7000-37FABE(config-wlan-qos-test)#no classification non-wmm
rfs7000-37FABE(config-wlan-qos-test)#no multicast-mask primary
rfs7000-37FABE(config-wlan-qos-test)#no qos trust dscp
```

Parameters

- no <PARAMETERS>

Negates a command or resets settings to their default
21.1.5 qos

- wlan-qos-policy

Enables QoS on this WLAN

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

qos trust [dscp|wmm]

Parameters

- qos trust [dscp|wmm]

| trust [dscp|wmm] | Trusts the QoS values of ingressing packets. Both these options are enabled by default. |
|-----------------|--------------------------------------------------------------------------------------|
| • dscp          | Trusts the IP DSCP values of ingressing packets                                      |
| • wmm           | Trusts the 802.11 WMM QoS values of ingressing packets                              |

Examples

rfs7000-37FABE(config-wlan-qos-test)#qos trust wmm
rfs7000-37FABE(config-wlan-qos-test)#qos trust dscp
rfs7000-37FABE(config-wlan-qos-test)#show context
wlan-qos-policy test
classification non-unicast normal
go trust dscp
gos trust wmm
accelerated-multicast autodetect classification voice
rfs7000-37FABE(config-wlan-qos-test)#
21.1.6 rate-limit

WLAN-QOS-POLICY

Configures the WLAN traffic rate limits using the WLAN QoS policy. Excessive traffic can cause performance issues or bring down the network entirely. Excessive traffic can be caused by numerous sources including network loops, faulty devices or malicious software such as a worm or virus that has infected one or more devices at the branch. Rate limiting limits the maximum rate sent to or received from the wireless network (and WLAN) per wireless client. It prevents any single user from overwhelming the wireless network. It can also provide differential service for service providers. The uplink and downlink rate limits are usually configured on a RADIUS server using vendor specific attributes. Rate limits are extracted from the RADIUS server’s response. When such attributes are not present, settings defined on the controller (access point, wireless controller, or service platform) are applied. An administrator can set separate QoS rate limits for upstream (data transmitted from the managed network) and downstream (data transmitted to the managed network).

Before defining rate limit thresholds for WLAN upstream and downstream traffic, it is recommended that you define the normal number of ARP, broadcast, multicast and unknown unicast packets that typically transmit and receive from each supported WMM access category. If thresholds are defined too low, normal network traffic (required by end-user devices) are dropped resulting in intermittent outages and performance problems.

Connected wireless clients can also have QoS rate limit settings defined in both the upstream and downstream direction.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

rate-limit [client|wlan] [from-air|to-air] {max-burst-size|rate|red-threshold}
rate-limit [client|wlan] [from-air|to-air] {max-burst-size <2-1024>|rate <50-1000000>}
rate-limit [client|wlan] [from-air|to-air] {red-threshold [background <0-100>|best-effort <0-100>|video <0-100>|voice <0-100>]}

Parameters
- rate-limit [client|wlan] [from-air|to-air] {max-burst-size <2-1024>|rate <50-1000000>}

<table>
<thead>
<tr>
<th>rate-limit</th>
<th>Configures traffic rate limit parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>client</td>
<td>Configures traffic rate limiting parameters on a per-client basis</td>
</tr>
<tr>
<td>wlan</td>
<td>Configures traffic rate limiting parameters on a per-WLAN basis</td>
</tr>
<tr>
<td>from-air</td>
<td>Configures traffic rate limiting from a wireless client to the network</td>
</tr>
<tr>
<td>to-air</td>
<td>Configures the traffic rate limit from the network to a wireless client</td>
</tr>
<tr>
<td>max-burst-size &lt;2-1024&gt;</td>
<td>Optional. Sets the maximum burst size from 2 - 1024 kbytes. The chances of the upstream or downstream packet transmission getting congested for the WLAN’s client destination are reduced for smaller burst sizes. The default values are:</td>
</tr>
</tbody>
</table>
- WLAN ‘to-air’ and ‘from-air’: 320 kbytes |
- Client ‘to-air’ and ‘from-air’: 64 kbytes |
Contd..
**rate-limit**

`[client|wlan] [from-air|to-air] {red-threshold [background <0-100> | best-effort <0-100> | video <0-100> | voice <0-100>]}`

---

<table>
<thead>
<tr>
<th><strong>Note:</strong> Smaller the burst, lesser are the chances of upstream packet transmission resulting in congestion for the WLAN’s client destinations. By trending the typical number of ARP, broadcast, multicast and unknown unicast packets over a period of time, the average rate for each access category can be obtained. Once a baseline is obtained, administrators should then add a 10% margin (minimally) to allow for traffic bursts at the site.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>rate &lt;50-1000000&gt;</strong> Optional. Sets the traffic rate from 50 - 1000000 Kbps. This limit is the threshold value for the maximum number of packets received or transmitted over the WLAN from all access categories. Any traffic that exceeds the specified rate is dropped and a log message is generated. The default values are:</td>
</tr>
<tr>
<td>- WLAN ‘to-air’ and ‘from-air’: 5000 kbytes</td>
</tr>
<tr>
<td>- Client ‘to-air’ and ‘from-air’: 1000 kbytes</td>
</tr>
<tr>
<td><strong>Note:</strong> Smaller the burst, lesser are the chances of upstream packet transmission resulting in congestion for the WLAN’s client destinations. By trending the typical number of ARP, broadcast, multicast and unknown unicast packets over a period of time, the average rate for each access category can be obtained. Once a baseline is obtained, administrators should then add a 10% margin (minimally) to allow for traffic bursts at the site.</td>
</tr>
<tr>
<td><strong>background &lt;0-100&gt;</strong> Optional. Sets the maximum burst size from 2 - 1024 kbytes. The chances of the upstream or downstream packet transmission getting congested for the WLAN’s client destination are reduced for smaller burst sizes. The default values are:</td>
</tr>
<tr>
<td>- WLAN ‘to-air’ and ‘from-air’: 320 kbytes</td>
</tr>
<tr>
<td>- Client ‘to-air’ and ‘from-air’: 64 kbytes</td>
</tr>
<tr>
<td><strong>Note:</strong> Smaller the burst, lesser are the chances of upstream packet transmission resulting in congestion for the WLAN’s client destinations. By trending the typical number of ARP, broadcast, multicast and unknown unicast packets over a period of time, the average rate for each access category can be obtained. Once a baseline is obtained, administrators should then add a 10% margin (minimally) to allow for traffic bursts at the site.</td>
</tr>
<tr>
<td><strong>best-effort &lt;0-100&gt;</strong> The following is common to the ‘from-air’ and ‘to-air’ parameters:</td>
</tr>
<tr>
<td>Optional. Sets a percentage value for best effort traffic in the upstream or downstream direction. Best effort traffic exceeding the defined threshold is dropped and a log message is generated. The default threshold values are:</td>
</tr>
<tr>
<td>- WLAN ‘to-air’ and ‘from-air’: 50%</td>
</tr>
<tr>
<td>- Client ‘to-air’ and ‘from-air’: 50%</td>
</tr>
<tr>
<td><strong>video &lt;0-100&gt;</strong> The following is common to the ‘from-air’ and ‘to-air’ parameters:</td>
</tr>
<tr>
<td>Optional. Sets a percentage value for video traffic in the upstream or downstream direction. Video traffic exceeding the defined threshold is dropped and a log message is generated. The default threshold values are:</td>
</tr>
<tr>
<td>- WLAN ‘to-air’ and ‘from-air’: 25%</td>
</tr>
<tr>
<td>- Client ‘to-air’ and ‘from-air’: 25%</td>
</tr>
</tbody>
</table>
voice <0-100>
The following is common to the ‘from-air’ and ‘to-air’ parameters:
Optional. Sets a percentage value for voice traffic in the upstream or downstream direction. Voice traffic exceeding the defined threshold is dropped and a log message is generated. The default threshold values are:
- WLAN ‘to-air’ and ‘from-air’: 0%
- Client ‘to-air’ and ‘from-air’: 0%
Note: A value of 0% means no early random drops.

Usage Guidelines
The following information should be taken into account when configuring rate limits:

- Background traffic consumes the least bandwidth, so this value can be set to a lower value once a general downstream rate is known by the network administrator (using a time trend analysis).
- Best effort traffic consumes little bandwidth, so this value can be set to a lower value once a general upstream rate is known by the network administrator (using a time trend analysis).
- Video traffic consumes significant bandwidth, so this value can be set to a higher value once a general upstream rate is known by the network administrator (using a time trend analysis).
- Voice applications consume significant bandwidth, so this value can be set to a higher value once a general upstream rate is known by the network administrator (using a time trend analysis).

Examples
rfs7000-37FABE(config-wlan-qos-test)#rate-limit wlan from-air max-burst-size 6
rfs7000-37FABE(config-wlan-qos-test)#rate-limit wlan from-air rate 55
rfs7000-37FABE(config-wlan-qos-test)#rate-limit wlan from-air red-threshold best-effort 10
rfs7000-37FABE(config-wlan-qos-test)#rate-limit client from-air red-threshold background 3

rfs7000-37FABE(config-wlan-qos-test)#show context
wlan-qos-policy test
  classification non-wmm video
  multicast-mask primary 11-22-33-44-55-66/22-33-44-55-66-77
  classification non-unicast normal
  rate-limit wlan from-air rate 55
  rate-limit wlan from-air max-burst-size 6
  rate-limit wlan from-air red-threshold best-effort 10
  rate-limit client from-air red-threshold background 3
  qos trust dscp
  qos trust wmm
  accelerated-multicast autodetect classification voice
rfs7000-37FABE(config-wlan-qos-test)#
21.1.7 **svp-prioritization**

- **wlan-qos-policy**

Enables WLAN SVP support on this WLAN QoS policy. SVP support enables the identification and prioritization of traffic from Spectralink/Ploycomm phones. This gives priority to voice, with voice management packets supported only on certain legacy VOIP phones. If the wireless client classification is WMM, non-WMM devices recognized as voice devices have all their traffic transmitted at voice priority. Devices are classified as voice, when they emit SIP, SCCP, or H323 traffic. Thus, selecting this option has no effect on devices supporting WMM.

This feature is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
svp-prioritization
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-wlan-qos-test)#svp-prioritization

rfs7000-37FABE(config-wlan-qos-test)#show context wlan-qos-policy test
   classification non-wmm video
   svp-prioritization
   multicast-mask primary 11-22-33-44-55-66/22-33-44-55-66-77
   classification non-unicast normal
   rate-limit wlan from-air rate 55
   rate-limit wlan from-air max-burst-size 6
   rate-limit wlan from-air red-threshold best-effort 10
   rate-limit client from-air red-threshold background 3
   qos trust dscp
   qos trust wmm
   accelerated-multicast autodetect classification voice

rfs7000-37FABE(config-wlan-qos-test)#
```


21.1.8 voice-prioritization

Prioritizes voice clients over other clients (for non-WMM clients). This gives priority to voice and voice management packets and is supported only on certain legacy VOIP phones. This feature is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

voice-prioritization

Parameters

None

Examples

rfs7000-37FABE(config-wlan-qos-test)#voice-prioritization

rfs7000-37FABE(config-wlan-qos-test)#show context
wlan-qos-policy test
classification non-wmm video
svp-prioritization
voice-prioritization
multicast-mask primary 11-22-33-44-55-66/22-33-44-55-66-77
classification non-unicast normal
rate-limit wlan from-air rate 55
rate-limit wlan from-air max-burst-size 6
rate-limit wlan from-air red-threshold best-effort 10
rate-limit client from-air red-threshold background 3
qos trust dscp
qos trust wmm
accelerated-multicast autodetect classification voice
rfs7000-37FABE(config-wlan-qos-test)#
21.1.9  wmm

wlan-qos-policy

- Configures 802.11e/Wireless Multimedia (WMM) parameters for this WLAN QoS policy

WMM makes it possible for both home networks and Enterprises to decide which data streams are most important and assign them a higher traffic priority.

WMM's prioritization capabilities are based on the four access categories (background, best-effort, video, and voice). Higher the Access Category (AC) higher is the transmission probability over the controller managed WLAN. ACs correspond to the 802.1d priorities, facilitating interoperability with QoS policy management mechanisms. WMM enabled controllers coexist with legacy devices (not WMM-enabled).

Packets not assigned to a specific access category are categorized as best effort by default. Applications assign each data packet to a given access category. Categorized packets are added to one of four independent transmit queues (one per access category). The client has an internal collision resolution mechanism to address collision among different queues, which selects the frames with the highest priority to transmit.

The same mechanism deals with external collision, to determine which client should be granted the Opportunity to Transmit (TXOP). The collision resolution algorithm responsible for traffic prioritization is probabilistic and depends on two timing parameters that vary for each access category. These parameters are:

- The minimum interframe space, or Arbitrary Inter-Frame Space Number (AIFSN)
- The contention window, sometimes referred to as the random back off wait

Both values are smaller for high-priority traffic. The value of the contention window varies through time. Initially the contention window is set to a value that depends on the AC. As frames with the highest AC tend to have the lowest back off values, they are more likely to get a TXOP.

After each collision the contention window is doubled until a maximum value (also dependent on the AC) is reached. After successful transmission, the contention window is reset to its initial, AC dependant value. The AC with the lowest back off value gets the TXOP.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

wmm [background|best-effort|power-save|qbss-load-element|video|voice]

wmm [power-save|qbss-load-element]

wmm [background|best-effort|video|voice] [aifsn <2-15>|cw-max <0-15>|cw-min <0-15>|txop-limit <0-65535>]

Parameters

- wmm [power-save|qbss-load-element]

<table>
<thead>
<tr>
<th>wmm</th>
<th>Configures 802.11e/wireless multimedia parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>power-save</td>
<td>Enables support for the WMM-Powersave mechanism. This mechanism, also known as Unscheduled Automatic Power Save Delivery (U-APSD), is specifically designed for WMM voice devices. This feature is enabled by default.</td>
</tr>
<tr>
<td>qbss-load-element</td>
<td>Enables support for the QOS Basic Service Set (QBSS) load information element in beacons and probe response packets advertised by access packets. This feature is enabled by default.</td>
</tr>
</tbody>
</table>
### wlan-qos-policy 21-17

- **wmm [background|best-effort|video|voice] [aifsn <2-15>|cw-max <0-15>|cw-min <0-15>|txop-limit <0-65535>]

<table>
<thead>
<tr>
<th><strong>wmm</strong></th>
<th>Configures 802.11e/wireless multimedia parameters. This parameter enables the configuration of four access categories. Applications assign each data packet to one of these four access categories and queues them for transmission.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>background</strong></td>
<td>Configures background access category parameters</td>
</tr>
<tr>
<td><strong>best-effort</strong></td>
<td>Configures best effort access category parameters. Packets not assigned to any particular access category are categorized by default as having best effort priority</td>
</tr>
<tr>
<td><strong>video</strong></td>
<td>Configures video access category parameters</td>
</tr>
<tr>
<td><strong>voice</strong></td>
<td>Configures voice access category parameters</td>
</tr>
</tbody>
</table>
| **aifsn <2-15>** | Configures *Arbitrary Inter-Frame Space Number* (AIFSN) from 2 - 15. AIFSN is the wait time between data frames. This parameter is common to background, best effort, video and voice.  
The default for traffic voice categories is 2  
The default for traffic video categories is 2  
The default for traffic best effort (normal) categories is 3  
The default for traffic background (low) categories is 7  
• <2-15> – Sets a value from 2 - 15 |
| **cw-max <0-15>** | Configures the maximum contention window. Wireless clients pick a number between 0 and the minimum contention window to wait before retransmission. Wireless clients then double their wait time on a collision, until it reaches the maximum contention window. This parameter is common to background, best effort, video and voice.  
The default for traffic voice categories is 3  
The default for traffic video categories is 4  
The default for traffic best effort (normal) categories 10  
The default for traffic background (low) categories is 10  
• <0-15> – ECW: the contention window. The actual value used is \((2^{ECW} - 1)\). Set a value from 0 - 15. |
| **cw-min <0-15>** | Configures the minimum contention window. Wireless clients pick a number between 0 and the minimum contention window to wait before retransmission. Wireless clients then double their wait time on a collision, until it reaches the maximum contention window. This parameter is common to background, best effort, video and voice.  
The default for traffic voice categories is 2  
The default for traffic video categories is 3  
The default for traffic best effort (normal) categories is 4  
The default for traffic background (low) categories is 4  
• <0-15> – ECW: the contention window. The actual value used is \((2^{ECW} - 1)\). Set a value from 0 - 15. |
| txop-limit <0-65535> | Configures the transmit-opportunity (the interval of time during which a particular client has the right to initiate transmissions). This parameter is common to background, best effort, video and voice. 
The default for traffic voice categories is 47 
The default for traffic video categories is 94 
The default for traffic best effort (normal) categories is 0 
The default for traffic background (low) categories is 0 
• <0-65535> – Set a value from 0 - 65535 to configure the transmit-opportunity in 32 microsecond units. |

**Examples**

```plaintext
rfs7000-37FABE(config-wlan-qos-test)#wmm video txop-limit 9
rfs7000-37FABE(config-wlan-qos-test)#wmm voice cw-min 6

rfs7000-37FABE(config-wlan-qos-test)#show context
wlan-qos-policy test
    classification non-wmm video
   svp-prioritization
    voice-prioritization
wmm video txop-limit 9
  wmm voice cw-min 6
  multicast-mask primary 11-22-33-44-55-66/22-33-44-55-66-77
  classification non-unicast normal
  rate-limit wlan from-air rate 55
  rate-limit wlan from-air max-burst-size 6
  rate-limit wlan from-air red-threshold best-effort 10
  rate-limit client from-air red-threshold background 3
  qos trust dscp
  qos trust wmm
  accelerated-multicast autodetect classification voice
rfs7000-37FABE(config-wlan-qos-test)#
```
This chapter summarizes Layer 2 Tunnel Protocol Version 3 (L2TPv3) policy commands in the CLI command structure.

The L2TPv3 policy defines control and encapsulation protocols for tunneling different types of layer 2 frames between two IP nodes. The L2TPv3 control protocol controls dynamic creation, maintenance, and tear down of L2TP sessions. The L2TPV3 encapsulation protocol is used to multiplex and de-multiplex L2 data streams between two L2TP nodes across an IP network.

L2TPv3 is an IETF standard used for transporting different types of layer 2 frames in an IP network (and access point profile). L2TPv3 defines control and encapsulation protocols for tunneling layer 2 frames between two IP nodes. Use L2TPv3 to create tunnels for transporting layer 2 frames. L2TPv3 enables WING supported controllers and access points to create tunnels for transporting Ethernet frames to and from bridge VLANs and physical ports. L2TPv3 tunnels can be defined between WING devices and other vendor devices supporting the L2TPv3 protocol.

Multiple pseudowires can be created within an L2TPv3 tunnel. WING supported devices support an Ethernet VLAN pseudowire type exclusively. A pseudowire is an emulation of a layer 2 point-to-point connection over a packet-switching network (PSN). A pseudowire was developed out of the necessity to encapsulate and tunnel layer 2 protocols across a layer 3 network. Ethernet VLAN pseudowires transport Ethernet frames to and from a specified VLAN. One or more L2TPv3 tunnels can be defined between tunnel end points. Each tunnel can have one or more L2TPv3 sessions. Each tunnel session corresponds to one pseudowire. An L2TPv3 control connection (an L2TPv3 tunnel) needs to be established between the tunneling entities before creating a session.

**NOTE:** A pseudowire is an emulation of a layer 2 point-to-point connection over a packet-switching network (PSN). A pseudowire was developed out of the necessity to encapsulate and tunnel layer 2 protocols across a layer 3 network.

Ethernet VLAN pseudowires transport Ethernet frames to and from a specified VLAN. One or more L2TPv3 tunnels can be defined between tunnel end points. Each tunnel can have one or more L2TPv3 sessions. Each tunnel session corresponds to one pseudowire. An L2TPv3 control connection (a L2TPv3 tunnel) needs to be established between the tunneling entities before creating a session.

For optimal pseudowire operation, both the L2TPv3 session originator and responder need to know the pseudowire type and identifier. These two parameters are communicated during L2TPv3 session establishment. An L2TPv3 session created within an L2TPv3 connection also specifies multiplexing parameters for identifying a pseudowire type and ID.
The working status of a pseudowire is reflected by the state of the L2TPv3 session. If a L2TPv3 session is down, the pseudowire associated with it must be shut down. The L2TPv3 control connection keep-alive mechanism can serve as a monitoring mechanism for the pseudowires associated with a control connection.

**NOTE:** If connecting an Ethernet port to another Ethernet port, the pseudowire type must be *Ethernet port*, if connecting an Ethernet VLAN to another Ethernet VLAN, the pseudowire type must be *Ethernet VLAN*.

This chapter is organized into the following sections:

- `l2tpv3-policy-commands`
- `l2tpv3-tunnel-commands`
- `l2tpv3-manual-session-commands`

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
22.1 l2tpv3-policy-commands

Use the (config) instance to configure L2TPv3 policy parameters. To navigate to the L2TPv3 policy instance, use the following commands:

```
 DEVICE>(config)#l2tpv3 policy <L2TPV3-POLICY-NAME>
 rfs7000-37FABE(config)#l2tpv3 policy L2TPV3Policy1
 rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#
```

L2TPv3 Policy Mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>cookie-size</td>
<td>Size of the cookie field present in each l2tpv3 data message</td>
<td>page 22-5</td>
</tr>
<tr>
<td>failover-delay</td>
<td>Time interval for re-establishing the tunnel after the failover</td>
<td>page 22-6</td>
</tr>
<tr>
<td></td>
<td>(RF-Domain manager/VRRP-master/Cluster-master failover)</td>
<td></td>
</tr>
<tr>
<td>force-l2-path-recovery</td>
<td>Enables force learning of servers, gateways etc., behind the l2tpv3 tunnel</td>
<td>page 22-7</td>
</tr>
<tr>
<td>hello-interval</td>
<td>Configure the time interval (in seconds) between l2tpv3 Hello keep-alive</td>
<td>page 22-8</td>
</tr>
<tr>
<td></td>
<td>messages exchanged in l2tpv3 control connection</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
<td>page 22-9</td>
</tr>
<tr>
<td>reconnect-attempts</td>
<td>Maximum number of attempts to reestablish the tunnel</td>
<td></td>
</tr>
<tr>
<td>reconnect-interval</td>
<td>Time interval between the successive attempts to reestablish the l2tpv3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tunnel</td>
<td></td>
</tr>
<tr>
<td>retry-attempts</td>
<td>Configure the maximum number of retransmissions for signaling message</td>
<td></td>
</tr>
<tr>
<td>retry-interval</td>
<td>Time interval (in seconds) before the initiating a retransmission of any</td>
<td></td>
</tr>
<tr>
<td></td>
<td>l2tpv3 signaling message</td>
<td></td>
</tr>
<tr>
<td>rx-window-size</td>
<td>Number of signaling messages that can be received without sending the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>acknowledgment</td>
<td></td>
</tr>
<tr>
<td>tx-window-size</td>
<td>Number of signaling messages that can be sent without receiving the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>acknowledgment</td>
<td></td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
<td></td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
<td></td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
<td></td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
<td></td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
<td></td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
<td></td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
<td></td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
<td></td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
<td></td>
</tr>
</tbody>
</table>

The following table summarizes L2TPv3 policy configuration commands:

```
Table 22.1 L2TPV3-Tunnel-Policy-Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>cookie-size</td>
<td>Configures the cookie field size for each L2TPv3 data packet</td>
<td>page 22-5</td>
</tr>
<tr>
<td>failover-delay</td>
<td>Configures the L2TPv3 tunnel failover delay in seconds</td>
<td>page 22-6</td>
</tr>
<tr>
<td>force-l2-path-recovery</td>
<td>Enables the forced detection of servers and gateways behind the L2TPv3</td>
<td>page 22-7</td>
</tr>
<tr>
<td></td>
<td>tunnel</td>
<td></td>
</tr>
<tr>
<td>hello-interval</td>
<td>Configures the interval, in seconds, between L2TPv3 “Hello” keep-alive</td>
<td>page 22-8</td>
</tr>
<tr>
<td></td>
<td>messages exchanged in the L2TPv3 control connection</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>Negates or reverts L2TPv3 tunnel commands</td>
<td>page 22-9</td>
</tr>
</tbody>
</table>
```
### Table 22.1 L2TPv3-Tunnel-Policy-Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>reconnect-attempts</td>
<td>Configures the maximum number of retransmissions for signalling messages</td>
<td>page 22-10</td>
</tr>
<tr>
<td>reconnect-interval</td>
<td>Configures the interval, in seconds, between successive attempts to re-</td>
<td>page 22-11</td>
</tr>
<tr>
<td></td>
<td>establish a failed tunnel connection</td>
<td></td>
</tr>
<tr>
<td>retry-attempts</td>
<td>Configures the maximum number of retransmissions of signalling messages</td>
<td>page 22-12</td>
</tr>
<tr>
<td>retry-interval</td>
<td>Configures the interval, in seconds, before initiating a retransmission of</td>
<td>page 22-13</td>
</tr>
<tr>
<td></td>
<td>any L2TPv3 signalling message</td>
<td></td>
</tr>
<tr>
<td>rx-window-size</td>
<td>Configures the number of signalling messages received without sending</td>
<td>page 22-14</td>
</tr>
<tr>
<td></td>
<td>an acknowledgment</td>
<td></td>
</tr>
<tr>
<td>tx-window-size</td>
<td>Configures the number of signalling messages transmitted without receiving</td>
<td>page 22-15</td>
</tr>
<tr>
<td></td>
<td>an acknowledgment</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
22.1.1 cookie-size

`l2tpv3-policy-commands`

Configures the size of the cookie field present in each L2TPv3 data packet. L2TPv3 data packets contain a session cookie that identifies the session (pseudowire) corresponding to it. In a tunnel, the cookie is a 4-byte or 8-byte signature shared between the two tunnel endpoints. This signature is configured at both the source and destination routers. If the signature at both ends do not match, the data is dropped. All sessions within a tunnel have the same session cookie size.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
cookie-size [0|4|8]
```

**Parameters**

- `cookie-size [0|4|8]`

| cookie-size [0|4|8] | Configures the cookie-field size for each data packet. Select one of the following options: |
|---------------------|--------------------------------------------------|
| 0                   | 0 – No cookie field present in each L2TPv3 data message (this is the default setting) |
| 4                   | 4 – 4 byte cookie field present in each L2TPv3 data message |
| 8                   | 8 – 8 byte cookie field present in each L2TPv3 data message |

**Examples**

```
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#cookie-size 8
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context
l2tpv3 policy L2TPV3Policy1
   cookie-size 8
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#
```

**Related Commands**

| `no` | Resets the cookie-field size to its default (0 - no cookie field present in each L2TPv3 data packet) |
22.1.2 failover-delay

*l2tpv3-policy-commands*

Configures the L2TPv3 tunnel failover delay in seconds. This is the interval after which a failed over tunnel is re-established.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

failover-delay <5-60>

**Parameters**

- failover-delay <5-60>

<table>
<thead>
<tr>
<th>failover-delay &lt;5-60&gt;</th>
<th>Sets the delay interval to re-establish a failed L2TPv3 tunnel (RF-Domain manager/VRRP-master/Cluster-master failover)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5-60&gt;</td>
<td>&lt;5-60&gt; — Specify a failover delay from 5 - 60 seconds. The default is 5 seconds.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#failover-delay 30

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context
l2tpv3 policy L2TPV3Policy1
  hello-interval 200
  failover-delay 30
  retry-attempts 10
  retry-interval 30
  cookie-size 8
  rx-window-size 9
  tx-window-size 9
  reconnect-interval 100
  reconnect-attempts 8
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#

**Related Commands**

| no | Resets the failover interval to its default (5 seconds) |
22.1.3 force-l2-path-recovery

- **l2tpv3-policy-commands**

Enables the forced detection of servers and gateways behind the L2TPv3 tunnel. This feature is disabled by default.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
force-l2-path-recovery
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#force-l2-path-recovery
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context
l2tpv3 policy L2TPV3Policy1
  hello-interval 200
  failover-delay 30
  retry-attempts 10
  retry-interval 30
  cookie-size 8
  rx-window-size 9
  tx-window-size 9
  reconnect-interval 100
  reconnect-attempts 8
force-l2-path-recovery
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables the forced detection of servers and gateways behind the L2TPv3 tunnel</td>
</tr>
</tbody>
</table>
### 22.1.4 hello-interval

**l2tpv3-policy-commands**

Configures the interval, in seconds, between L2TPv3 “Hello” keep-alive messages exchanged in a L2TPv3 control connection.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`hello-interval <1-3600>`

**Parameters**

- `hello-interval <1-3600>`

<table>
<thead>
<tr>
<th>hello-interval &lt;1-3600&gt;</th>
<th>Configures the interval for L2TPv3 “Hello” keep-alive messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-3600&gt;</td>
<td>• &lt;1-3600&gt; – Specify a value from 1 - 3600 seconds (default is 60 seconds).</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#hello-interval 200

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context l2tpv3 policy L2TPV3Policy1  
  hello-interval 200  
  cookie-size 8  

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#
```

**Related Commands**

- `no` Resets the “Hello” keep-alive message interval to its default of 60 seconds
22.1.5 no

**l2tpv3-policy-commands**

Negates or reverts L2TPv3 policy settings to default

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no [cookie-size|failover-delay|force-l2-path-recovery|hello-interval|
reconnect-attempts|reconnect-interval|retry-attempts|retry-interval|rx-window-size|
tx-window-size]
```

**Parameters**

- `no <PARAMETERS>`

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Negates or reverts L2TPv3 policy settings to default</th>
</tr>
</thead>
</table>

**Examples**

The following example shows the l2tpv3 policy ‘L2TPV3Policy1’ settings before the ‘no’ commands are executed:

```
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context
l2tpv3 policy L2TPV3Policy1
  hello-interval 200
  retry-attempts 10
  retry-interval 30
  cookie-size 8
  reconnect-interval 100
  reconnect-attempts 50
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#
```

```
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#no hello-interval
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#no reconnect-attempts
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#no reconnect-interval
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#no retry-attempts
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#no retry-interval
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#no cookie-size
```

The following example shows the l2tpv3 policy ‘L2TPV3Policy1’ settings after the ‘no’ commands are executed:

```
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context
l2tpv3 policy L2TPV3Policy1
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#
```
22.1.6 reconnect-attempts

Configures the maximum number of attempts made to re-establish a tunnel connection

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
reconnect-attempts <0-8>

Parameters
* reconnect-attempts <0-8>

<table>
<thead>
<tr>
<th>reconnect-attempts &lt;0-8&gt;</th>
<th>Configures the maximum number of attempts made to re-establish a tunnel connection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;0-8&gt; – Specify a value from 0 - 8 (default is 0: configures infinite reconnect attempts).</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#reconnect-attempts 8
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context
l2tpv3 policy L2TPV3Policy1
  hello-interval 200
  cookie-size 8
  reconnect-attempts 8
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#

Related Commands
| no | Resets the maximum number of reconnect attempts to default (0: configures infinite reconnect attempts) |
### 22.1.7 reconnect-interval

**l2tpv3-policy-commands**

Configures the interval, in seconds, between two successive attempts to re-establish a failed tunnel connection.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
reconnect-interval <1-3600>
```

**Parameters**

- `reconnect-interval <1-3600>`

**Examples**

```
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#reconnect-interval 100
```

```
l2tpv3 policy L2TPV3Policy1
  hello-interval 200
  cookie-size 8
  reconnect-interval 100
  reconnect-attempts 8
  rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#
```

**Related Commands**

- `no`
  
  Resets the interval between successive attempts to re-establish a failed tunnel connection to default (120 seconds).
22.1.8 retry-attempts

Configures the maximum number of attempts made to retransmit signalling messages. Use this command to specify how many retransmission cycles occur before determining the target tunnel peer is not reachable.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
retry-attempts <1-10>

Parameters
- retry-attempts <1-10>

| retry-attempts <1-10> | Configures the maximum number of attempts made to retransmit signalling messages
|-----------------------|----------------------------------------------------------------------------------|
|                       | • <1-10> – Specify a value from 1 - 10 (default is 5 attempts).

Examples
rfs7000-37FABE(config-l2tpv3-policy-L2TP3Policy1)#retry-attempts 10
rfs7000-37FABE(config-l2tpv3-policy-L2TP3Policy1)#show context
l2tpv3 policy L2TP3Policy1
  hello-interval 200
  retry-attempts 10
  cookie-size 8
  reconnect-interval 100
  reconnect-attempts 8
rfs7000-37FABE(config-l2tpv3-policy-L2TP3Policy1)#

Related Commands
- no
  Resets the maximum number of retransmissions of signalling messages to default (5 attempts)
22.1.9 retry-interval

- **l2tpv3-policy-commands**

  Configures the interval, in seconds, between two successive attempts at retransmitting a L2TPv3 signalling message.

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6523, AP6662, AP671XX, AP7502, AP7522, AP7532, AP7652, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

retry-interval <1-250>

**Parameters**

- retry-interval <1-250>

**Examples**

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#retry-interval 30

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context
l2tpv3 policy L2TPV3Policy1
hello-interval 200
retry-attempts 10
retry-interval 30
cookie-size 8
reconnect-interval 100
reconnect-attempts 8
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#

**Related Commands**

- **no**

  Resets the retry interval to default (5 seconds).
22.1.10 *rx-window-size*

**l2tpv3-policy-commands**

Configures the number of signalling packets received without sending an acknowledgment

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`rx-window-size <1-15>`

**Parameters**

- `rx-window-size <1-15>`

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Configures the number of packets received without sending an acknowledgment</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>rx-window-size &lt;1-15&gt;</code></td>
<td>• <code>&lt;1-15&gt;</code> – Specify a value from 1 - 15 (default is 10 packets).</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#rx-window-size 9
```

```
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context l2tpv3 policy L2TPV3Policy1 hello-interval 200 retry-attempts 10 retry-interval 30 cookie-size 8 rx-window-size 9 reconnect-interval 100 reconnect-attempts 8
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets the number of packets received without sending an acknowledgment to default (10 packets)</td>
</tr>
</tbody>
</table>
### 22.1.11 `tx-window-size`

[22tpv3-policy-commands]

Configures the number of signalling packets transmitted without receiving an acknowledgment

**Supported in the following platforms:**
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
tx-window-size <1-15>
```

**Parameters**

- `tx-window-size <1-15>`

| `tx-window-size <1-15>` | Configures the number of packets transmitted without receiving an acknowledgment
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;1-15&gt;</code></td>
<td><code>&lt;1-15&gt;</code> – Specify a value from 1 - 15 (default is 10 packets).</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#tx-window-size 9

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context
l2tpv3 policy L2TPV3Policy1
    hello-interval 200
    retry-attempts 10
    retry-interval 30
    cookie-size 8
    rx-window-size 9
    tx-window-size 9
    reconnect-interval 100
    reconnect-attempts 8

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#
```

**Related Commands**

| `no` | Resets the number of packets transmitted without receiving an acknowledgment to default (10 packets) |
22.2 l2tpv3-tunnel-commands

L2TPV3-POLICY

Use the (profile or device context) instance to configure a L2TPv3 tunnel. To navigate to the tunnel configuration mode, use the following command in the profile context:

```
<DEVICE>(config-profile-default-rfs7000)#l2tpv3 tunnel <TUNNEL-NAME>
```

```
rfs7000-37FABE(config-profile-default-rfs7000)#l2tpv3 tunnel Tunnel1
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```

L2TPV3 Tunnel Mode commands:

- `establishment-criteria`: Set tunnel establishment criteria
- `fast-failover`: Configure fast failover for L2TPv3 tunnels
- `hostname`: Tunnel specific local hostname
- `local-ip-address`: Configure the IP address for tunnel. If not specified, tunnel source ip address would be chosen automatically based on the tunnel peer ip address
- `mtu`: Configure the mtu size for the tunnel
- `no`: Negate a command or set its defaults
- `peer`: Configure the L2TPv3 tunnel peers. At least one peer must be specified
- `router-id`: Tunnel specific local router ID
- `session`: Create / modify the specified L2TPv3 session
- `use`: Set setting to use
- `clrscr`: Clears the display screen
- `commit`: Commit all changes made in this session
- `end`: End current mode and change to EXEC mode
- `exit`: End current mode and down to previous mode
- `help`: Description of the interactive help system
- `revert`: Revert changes
- `service`: Service Commands
- `show`: Show running system information
- `write`: Write running configuration to memory or terminal

```
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```

The following table summarizes L2TPv3 tunnel configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>establishment-criteria</code></td>
<td>Configures L2TPv3 tunnel establishment criteria</td>
<td>page 22-17</td>
</tr>
<tr>
<td><code>fast-failover</code></td>
<td>Configures fast-failover support on the L2TPv3 tunnel</td>
<td>page 22-18</td>
</tr>
<tr>
<td><code>hostname</code></td>
<td>Configures tunnel specific local hostname</td>
<td>page 22-19</td>
</tr>
<tr>
<td><code>local-ip-address</code></td>
<td>Configures the tunnel's IP address</td>
<td>page 22-20</td>
</tr>
<tr>
<td><code>mtu</code></td>
<td>Configures the tunnel's <em>Maximum Transmission Unit</em> (MTU) size</td>
<td>page 22-21</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negates or reverts L2TPv3 tunnel commands</td>
<td>page 22-22</td>
</tr>
<tr>
<td><code>peer</code></td>
<td>Configures the tunnel's peers</td>
<td>page 22-23</td>
</tr>
<tr>
<td><code>router-id</code></td>
<td>Configures the tunnel's local router ID</td>
<td>page 22-26</td>
</tr>
<tr>
<td><code>session</code></td>
<td>Creates/modifyes specified L2TPv3 session</td>
<td>page 22-27</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Configures a tunnel to use a specified L2TPv3 tunnel policy</td>
<td>page 22-29</td>
</tr>
</tbody>
</table>
### 22.2.1 establishment-criteria

**l2tpv3-tunnel-commands**

Configures L2TPv3 tunnel establishment criteria

A L2TPv3 tunnel is established from the current device to the NOC controller when the current device becomes the VRRP master, cluster master, or RF Domain manager. Similarly, the L2TPv3 tunnel is closed when the current device switches to standby or backup mode.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
establishment-criteria [always|cluster-master|rf-domain-manager|vrrp-master <1-255>]
```

**Parameters**

- `establishment-criteria [always|cluster-master|rf-domain-manager|vrrp-master <1-255>]`
  - **always**: Always establishes a L2TPv3 tunnel from the current device to the NOC controller. This is the default setting.
    - **Note**: The 'always' option indicates the device need not be a cluster-master, rf-domain-manager, or vrrp-master to establish a tunnel.
  - **cluster-master**: Establishes a L2TPv3 tunnel from the current device to the NOC controller, only when the current device becomes the cluster master
    - **Note**: The L2TPv3 tunnel is closed when the current device switches back the standby or backup mode.
  - **rf-domain-manager**: Establishes a L2TPv3 tunnel from the current device to the NOC controller, only when the current device becomes the RF Domain manager
    - **Note**: The L2TPv3 tunnel is closed when the current device switches back the standby or backup mode.
  - **vrrp-master <1-255>**: Establishes a L2TPv3 tunnel from the current device to the NOC controller, only when the current device becomes the VRRP master
    - `<1-255>` — Specify the VRRP group number from 1 - 255.
    - **Note**: The L2TPv3 tunnel is closed when the current device switches back the standby or backup mode.

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#establishment-criteria cluster-master

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context l2tpv3 tunnel Tunnel1
   establishment-criteria cluster-master
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```

**Related Commands**

- **no**: Resets to default (always)
22.2 fast-failover

l2tpv3-tunnel-commands

Configures fast-failover support on the L2TPv3 tunnel. When configured, devices, using this profile, send tunnel requests to both peers, and in turn, establish tunnels with both peers. If not configured, tunnel establishment occurs on one peer, with failover and other functionality the same as legacy behavior. In case fast failover is configured when an active tunnel, with one peer, already exists, the tunnel establishment process is re-initiated with both peers. Of the two tunnels established, one is marked active while the other is standby. The sessions and routes from the active tunnel are only pushed to the dataplane, resulting in creation of data sessions. However, if the active tunnel fails, sessions and routes from the standby tunnel are pushed to the dataplane thereby providing almost immediate fail over. Both tunnels individually perform connection health checkups through hello intervals. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

fast-failover {aggressive}

Parameters
- fast-failover {aggressive}

<table>
<thead>
<tr>
<th>fast-failover</th>
<th>Configures fast-failover support on the L2TPv3 tunnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>aggressive</td>
<td>Optional. When enabled, tunnel initiation hello requests are set to zero. For failure detections, hello attempts are not retried, regardless of the number of retry attempts configured. This option is disabled by default. Note: The hello-interval and retry-attempts parameters are defined in the L2TPv3 Policy context. For more information on configuring an L2TPv3 policy, see l2tpv3-policy-commands. For more information on associating an L2TPv3 policy to an L2TPv3 tunnel, see use.</td>
</tr>
</tbody>
</table>

Examples

nx9500-6C8809(config-profile testNX9000-l2tpv3-tunnel-TestTunnel2)#show context include-factory | include fast-failover
  no fast-failover
nx9500-6C8809(config-profile testNX9000-l2tpv3-tunnel-TestTunnel2)#

nx9500-6C8809(config-profile testNX9000-l2tpv3-tunnel-TestTunnel2)#fast-failover aggressive

nx9500-6C8809(config-profile testNX9000-l2tpv3-tunnel-TestTunnel2)#show context l2tpv3 tunnel TestTunnel2
  fast-failover aggressive
nx9500-6C8809(config-profile testNX9000-l2tpv3-tunnel-TestTunnel2)#

Related Commands

no | Removes fast-failover support on the L2TPv3 tunnel
22.2.3 hostname

- **l2tpv3-tunnel-commands**

  Configures the tunnel's local hostname

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

hostname <WORD>

**Parameters**

- hostname <WORD>

<table>
<thead>
<tr>
<th>hostname &lt;WORD&gt;</th>
<th>Configures the tunnel’s local hostname</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt; – Specify the tunnel’s local hostname.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#hostname TunnelHost1
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context l2tpv3 tunnel Tunnel1
  hostname TunnelHost1
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#ab
```

**Related Commands**

| no                | Removes the tunnel's local hostname |
22.2.4 local-ip-address

* l2tpv3-tunnel-commands

Configures the tunnel's source IP address. If no IP address is specified, the tunnel's source IP address is automatically configured based on the tunnel's peer IP address.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
local-ip-address <IP>
```

**Parameters**

- local-ip-address <IP>

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#local-ip-address 172.16.10.2
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context l2tpv3 tunnel Tunnel1
  local-ip-address 172.16.10.2
  hostname TunnelHost1
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```

**Related Commands**

- `no`
  Resets the tunnel's local IP address and re-establishes the tunnel
### 22.2.5 mtu

**l2tpv3-tunnel-commands**

Configures the MTU size for this tunnel. This value determines the packet size transmitted over this tunnel.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
mtu <128-1460>
```

**Parameters**

- `mtu <128-1460>`

**Examples**

```bash
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#mtu 1280
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context l2tpv3 tunnel Tunnel1
  local-ip-address 172.16.10.2
  mtu 1280
  hostname TunnelHost1
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```

**Related Commands**

- `no` Resets the MTU size for this tunnel to default (1460 bytes)
22.2.6 no

Negates or reverts a L2TPv3 tunnel settings to default

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [establishment-criteria|fast-failover|hostname|local-ip-address|mtu|peer <1-2>|router-id|session|use]

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Negates or reverts a L2TPv3 tunnel settings to default |

Examples

The tunnel settings before the ‘no’ command is executed:

```bash
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context l2tpv3 tunnel Tunnel1
local-ip-address 172.16.10.2
mtu 1280
hostname TunnelHost1
establishment-criteria cluster-master
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```

The tunnel settings after the ‘no’ command is executed:

```bash
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#no local-ip-address
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#no mtu
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#no hostname

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context l2tpv3 tunnel Tunnel1
establishment-criteria cluster-master
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```
### 22.2.7 peer

#### l2tpv3-tunnel-commands

Configures the L2TPv3 tunnel's peers. At least one peer must be specified.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

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<thead>
<tr>
<th>Syntax</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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<td>peer &lt;1-2&gt; {hostname</td>
<td>ip-address</td>
</tr>
<tr>
<td>peer &lt;1-2&gt; {hostname [&lt;HOSTNAME&gt;</td>
<td>any]} {ipsec-secure</td>
</tr>
<tr>
<td>peer &lt;1-2&gt; {ip-address &lt;IP&gt;} {hostname</td>
<td>ipsec-secure</td>
</tr>
<tr>
<td>peer &lt;1-2&gt; {router-id [&lt;IP&gt;</td>
<td>&lt;WORD&gt;</td>
</tr>
<tr>
<td>peer &lt;1-2&gt; {udp} {ipsec-secure</td>
<td>port &lt;1-65535&gt;}</td>
</tr>
</tbody>
</table>

#### Parameters

- **peer <1-2> {hostname [<HOSTNAME>|any]} {ipsec-secure|router-id|udp}**
  - **hostname [<HOSTNAME>|any]**
    - Optional. Configures the peers’ hostname. The hostname options are:
      - <HOSTNAME> – Specifies the hostname as *Fully Qualified Domain Name (FQDN)* or partial DN or any other name
      - any – Peer name is not specified. If the hostname is ‘any’ this tunnel is considered as responder only and will allow incoming connection from any host.
  - **router-id [<IP>|<WORD>|any]**
    - Optional. Configures the peer router ID in one of the following formats:
      - <IP> – Peer router ID in the IP address (A.B.C.D) format
      - <WORD> – Peer router ID range (for example, 100-120)
      - any – Peer router ID is not specified. This allows incoming connection from any router ID.

- **peer <1-2> {ipsec-secure|port <1-65535>}**
  - **ipsec-secure {gw [<IP>|<WORD>]}**
    - After specifying the peer hostname, optionally specify the IPSec settings:
      - ipsec-secure – Optional. Enables auto IPSec on the L2TPv3 tunnel
      - gw – Optional. Configures the IPSec gateway. Use one of the following options to configure the IPSec gateway:
        - <IP> – Configures IPSec gateway’s IP address
        - <WORD> – Configures IPSec gateway’s hostname

- **peer <1-2> {udp} {ipsec-secure|port <1-65535>}**
  - **udp**
    - Optional. Configures the tunnel's UDP port and optional IPSec settings
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>peer &lt;1-2&gt; {ip-address&lt;IP&gt;} {hostname</td>
<td>ipsec-secure</td>
</tr>
<tr>
<td>ip-address&lt;IP&gt;</td>
<td>Optional. Configures the peer’s IP address in the A.B.C.D format.</td>
</tr>
<tr>
<td>hostname [&lt;FQDN&gt;</td>
<td>any]</td>
</tr>
<tr>
<td>ipsec-secure {gw [&lt;IP&gt;</td>
<td>&lt;WORD&gt;]}</td>
</tr>
<tr>
<td>router-id [&lt;A.B.C.D&gt;</td>
<td>&lt;WORD&gt;</td>
</tr>
<tr>
<td>udp {ipsec-secure gw} port &lt;1-65535&gt; {ipsec-secure}</td>
<td>After specifying the peer IP address, optionally specify the peer’s UDP port settings:</td>
</tr>
</tbody>
</table>

**udt**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>peer &lt;1-2&gt; {ip-address&lt;IP&gt;} {hostname</td>
<td>ipsec-secure</td>
</tr>
<tr>
<td>ip-address&lt;IP&gt;</td>
<td>Optional. Configures the peer’s IP address in the A.B.C.D format.</td>
</tr>
<tr>
<td>hostname [&lt;FQDN&gt;</td>
<td>any]</td>
</tr>
<tr>
<td>ipsec-secure {gw [&lt;IP&gt;</td>
<td>&lt;WORD&gt;]}</td>
</tr>
<tr>
<td>router-id [&lt;A.B.C.D&gt;</td>
<td>&lt;WORD&gt;</td>
</tr>
<tr>
<td>udp {ipsec-secure gw} port &lt;1-65535&gt; {ipsec-secure}</td>
<td>After specifying the peer IP address, optionally specify the peer’s UDP port settings:</td>
</tr>
</tbody>
</table>

The UDP option configures the encapsulation mode for this tunnel.

- **UDP** – Optional. Configures UDP encapsulation (default encapsulation is IP)
  - ipsec-secure gw – Optional. Enables auto IPsec
  - port <1-65535> (ipsec-secure) – Optional. Configures the peer’s UDP port running the L2TPv3 service from 1 - 65535. After specifying the peer UDP port, optionally configure the IPsec settings.

**Summary**

- After specifying the peer hostname, optionally specify UDP settings:
  - The UDP option configures the encapsulation mode for this tunnel.
  - **UDP** – Optional. Configures UDP encapsulation (default encapsulation is IP)
    - ipsec-secure gw – Optional. Enables auto IPsec
    - port <1-65535> (ipsec-secure) – Optional. Configures the peer’s UDP port running the L2TPv3 service from 1 - 65535. After specifying the peer UDP port, optionally configure the IPsec settings.
### L2TPv3-Policy 22-25

#### peer 1-2 {router-id <IP>|<WORD>|any} {ipsec-secure|udp}

<table>
<thead>
<tr>
<th>peer 1-2</th>
<th>Configures the tunnel peer ID from 1 - 2. At any time the tunnel is established with only one peer.</th>
</tr>
</thead>
</table>
| router-id [<A.B.C.D>|<WORD>|any] | Optional. Configures the peer's router-id in one of the following formats:  
  - <A.B.C.D> – Peer router ID in the IP address (A.B.C.D) format  
  - <WORD> – Peer router ID range (for example, 100-120)  
  - any – Peer router ID is not specified. This allows incoming connection from any router ID. |
| ipsec-secure {gw <IP>|<WORD>} | After specifying the peer’s router ID, optionally specify the IPSec settings.  
  - ipsec-secure – Optional. Enables auto IPSec  
  - gw – Optional. Configures the IPSec gateway. Use one of the following options to configure the IPSec gateway:  
    - <IP> – Configures IPSec gateway’s IP address  
    - <WORD> – Configures IPSec gateway’s hostname |
| udp {ipsec-secure gw|port 1-65535} {ipsec-secure} | Optional. Configures UDP encapsulation for this tunnel’s peer.  
  - UDP – Optional. Configures UDP encapsulation (default encapsulation is IP)  
  - ipsec-secure gw – Optional. Enables auto IPSec  
  - port 1-65535 – Optional. Configures the peer’s UDP port running the L2TPv3 service from 1 - 65535. After specifying the peer UDP port, optionally configure the IPSec settings. |

##### Examples

```bash
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#peer 2
hostname tunnel1peer1 udp port 100
```

```bash
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context l2tpv3 tunnel Tunnel1  
  peer 2 hostname tunnel1peer1 udp port 100  
  establishment-criteria cluster-master
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```

#### Related Commands

- no | Remoes the peer configured for this tunnel |
22.2.8 router-id

Configures the tunnel's local router ID

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
router-id [<1-4294967295>|<IP>]

Parameters
- router-id [<1-4294967295>|<IP>]

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>router-id [&lt;1-4294967295&gt;</td>
<td>&lt;IP&gt;]</td>
</tr>
<tr>
<td></td>
<td>- &lt;1-4294967295&gt; – Router ID in the number format (from 1 - 4294967295)</td>
</tr>
<tr>
<td></td>
<td>- &lt;IP&gt; – Router ID in IP address format (A.B.C.D)</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#router-id 2000
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context l2tpv3 tunnel Tunnel1
    peer 2 hostname tunnelpool1 udp port 100
    router-id 2000
    establishment-criteria cluster-master
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#

Related Commands
- **no** Removes the tunnel's router ID
22.2.9 session

**l2tpv3-tunnel-commands**

Configures a session’s pseudowire ID, which describes the session’s purpose. The session established message sends this pseudowire ID to the L2TPv3 peer.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
session <L2TPV3-SESSION-NAME> [pseudowire-id|rate-limit]
```

```
session <L2TPV3-SESSION-NAME> pseudowire-id <1-4294967295> traffic-source
   vlan <VLAN-ID-RANGE> {native-vlan <1-4094>}
```

```
session <L2TPV3-SESSION-NAME> rate-limit [egress|ingress] rate <50-1000000>
   max-burst-size <2-1024>
```

**Parameters**

- **session <L2TPV3-SESSION-NAME>**
  - **pseudowire-id <1-4294967295>**
    - Configures the pseudowire ID for this session from 1- 4204067295
    - A pseudowire is an emulation of a layer 2 point-to-point connection over a *packet-switching network* (PSN). A pseudowire is needed to encapsulate and tunnel layer 2 protocols across a layer 3 network.
  - **traffic-source vlan <VLAN-ID-RANGE> {native-vlan <1-4094>}**
    - Configures VLAN as the traffic source for this tunnel
  - **native-vlan <1-4094>**
    - Optional – Configures the native VLAN ID for this session, which is not tagged
- **session <L2TPV3-SESSION-NAME> rate-limit [egress|ingress] rate <50-1000000>**
  - **max-burst-size <2-1024>**
    - Configures this session’s name
      - **<L2TPV3-SESSION-NAME>** – Specify the L2TPV3 session name (should not exceed 31 characters in length). A tunnel is usable only if it has one or more session(s) (having specific session names) configured. The L2TPv3 tunnel has no idle timeout, it closes when the last tunnel session is closed.
Usage Guidelines

The working status of a pseudowire is reflected by the state of the L2TPv3 session. If the corresponding session is L2TPv3 down, the pseudowire associated with it must be shut down.

Examples

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#session
tunnel1peer1session1 pseudowire-id 5000 traffic-source vlan 10-20 native-vlan 1

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context
l2tpv3 tunnel Tunnel1
    peer 2 hostname tunnel1peer1 udp port 100
    session tunnel1peer1session1 pseudowire-id 5000 traffic-source vlan 10-20 native-vlan 1
    router-id 2000
    establishment-criteria cluster-master

Related Commands

no | Removes a session
22.2.10 use

L2TPV3-POLICY-commands

Configures a tunnel to use a specified L2TPv3 tunnel policy and specified critical resources.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

use [critical-resource|l2tpv3-policy]
use critical-resource <CRM-NAME1> {<CRM-NAME2>} {<CRM-NAME3>} {<CRM-NAME4>}
use l2tpv3-policy <L2TPV3-POLICY-NAME>

Parameters

- use critical-resource <CRM-NAME1> {<CRM-NAME2>} {<CRM-NAME3>} {<CRM-NAME4>}

  Specifies the critical resource(s) to use with this tunnel.
  - <CRM1-NAME> – Specify the first critical resource name (should be existing).
  - <CRM-NAME2/3/4> – Optional. Specify the second/third/fourth critical resource names. Maximum of four critical resources can be monitored.

  **Note:** In case of tunnel initiator, L2TPv3 tunnel is established only if the critical resources identified by the <CRM-NAME1>.................. <CRM-NAME4> arguments are available at the time of tunnel establishment.

  **Note:** In case of L2TPv3 tunnel termination, all incoming tunnel establishment requests are rejected if the critical resources specified by the <CRM-NAME1> .................. <CRM-NAME4> arguments are not available.

- use l2tpv3-policy <L2TPV3-POLICY-NAME>

  Associates a specified L2TPv3 policy with this tunnel.
  - <L2TPV3-POLICY-NAME> – Specify the policy name (should be existing and configured).

Examples

```
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#use l2tpv3-policy L2TPV3Policy1
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context l2tpv3 tunnel Tunnel1
peer 2 hostname tunne1peer1 udp port 100
use l2tpv3-policy L2TPV3Policy1
session tunne1peer1session1 pseudowire-id 5000 traffic-source vlan 10-20 native-vlan 1 router-id 2000
establishment-criteria cluster-master
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```

Related Commands

- **no**

  Removes the L2TPv3 policy configured with a tunnel and reverts to the default tunnel policy.
22.3 l2tpv3-manual-session-commands

After a successful tunnel connection and establishment, individual sessions can be created. Each session is a single data stream. After successful session establishment, data corresponding to that session (pseudowire) can be transferred. If a session is down, the pseudowire associated with it is shut down as well.

Use the (profile-context) instance to manually configure a L2TPv3 session. To navigate to the L2TPv3 manual session configuration mode, use the following command in the profile context:

```
<DEVICE>(config-profile-default-rfs7000)#l2tpv3 manual-session <SESSION-NAME>
```

```
rfs7000-37FABE(config-profile-default-rfs7000)#l2tpv3 manual-session test
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#
```

The following table summarizes L2TPv3 manual session configuration commands:

### Table 22.3 L2TPV3-Manual-Session-Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
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<td>local-cookie</td>
<td>Configures the manual session's local cookie field size</td>
<td>page 22-31</td>
</tr>
<tr>
<td>local-ip-address</td>
<td>Configures the manual session's local source IP address</td>
<td>page 22-32</td>
</tr>
<tr>
<td>local-session-id</td>
<td>Configures the manual session's local session ID</td>
<td>page 22-33</td>
</tr>
<tr>
<td>mtu</td>
<td>Configures the MTU size for the manual session tunnel</td>
<td>page 22-34</td>
</tr>
<tr>
<td>no</td>
<td>Negates or reverts L2TPv3 manual session commands to default</td>
<td>page 22-22</td>
</tr>
<tr>
<td>peer</td>
<td>Configures the manual session's peers</td>
<td>page 22-36</td>
</tr>
<tr>
<td>remote-cookie</td>
<td>Configures the remote cookie for the manual session</td>
<td>page 22-37</td>
</tr>
<tr>
<td>remote-session-id</td>
<td>Configures the manual session's remote session ID</td>
<td>page 22-38</td>
</tr>
<tr>
<td>traffic-source</td>
<td>Configures the traffic source tunneled by the manual session</td>
<td>page 22-39</td>
</tr>
</tbody>
</table>
### 22.3.1 local-cookie

**l2tpv3-manual-session-commands**

Configures the local cookie field size for the manual session

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
local-cookie size [4|8] <1-4294967295> {<1-4294967295>}
```

**Parameters**

- `local-cookie size [4|8] <1-4294967295> {<1-4294967295>}`

| local-cookie size [4|8] | Configures the local cookie field size for this manual session. The options are:
|-------------------------|---------------------------------------------------------------|
| 4 - 4 byte local cookie field
| 8 - 8 byte local cookie field

| <1-4294967295> | Configures the local cookie value first word. Applies to both the 4 byte and 8 byte local cookies

| <1-4294967295> | Optional – Configures the local cookie value second word. Applicable to only 8 byte cookies. This parameter is ignored for 4 byte cookies.

**Examples**

```plaintext
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#local-cookie size 8 200 300
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context l2tpv3 manual-session test
  local-cookie size 8 200 300
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#
```

**Related Commands**

- `no` Removes the local cookie size configured for a manual session
22.3.2 local-ip-address

**l2tpv3-manual-session-commands**

Configures the manual session's source IP address. If no IP address is specified, the tunnel's source IP address is automatically configured based on the tunnel peer IP address. This parameter is applicable when establishing the session and responding to incoming requests.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
local-ip-address <IP>
```

**Parameters**

- `local-ip-address <IP>`

<table>
<thead>
<tr>
<th><code>local-ip-address &lt;IP&gt;</code></th>
<th>Configures the manual session's source IP</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;IP&gt;</code></td>
<td>Specify the IP address in the A.B.C.D format.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#local-ip-address 1.2.3.4
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context l2tpv3 manual-session test
local-cookie size 8 200 300
local-ip-address 1.2.3.4
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#
```

**Related Commands**

```plaintext
no
```

Resets the manual session's local source IP address. This re-establishes the session.
22.3.3 local-session-id

**l2tpv3-manual-session-commands**

Configures the manual session's local session ID

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

local-session-id <1-63>

**Parameters**

- local-session-id <1-63>

<table>
<thead>
<tr>
<th>local-session-id &lt;1-63&gt;</th>
<th>Configures this manual session's local session ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;1-63&gt; – Specify the ID from 1 - 63. This is the pseudowire ID for the session. This pseudowire ID is sent in a session establishment message to the L2TP peer.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#local-session-id 1

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context l2tpv3 manual-session test
  local-cookie size 8 200 300
  local-ip-address 1.2.3.4
  local-session-id 1
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#

**Related Commands**

| no | Removes the manual session's local session ID |
22.3.4 mtu

-configures the MTU size for the manual session tunnel. The MTU is the size (in bytes) of the largest protocol data unit the layer can pass between tunnel peers in this session. A larger MTU means processing fewer packets for the same amount of data.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

mtu <128-1460>

Parameters

- mtu <128-1460>

| mtu <128-1460> | Configures the MTU size for this manual session tunnel
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;128-1460&gt;</td>
<td>— Specify a value from 128 - 1460 bytes (default is 1460 bytes).</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#mtu 200

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context l2tpv3 manual-session test
  local-cookie size 8 200 300
  local-ip-address 1.2.3.4
  mtu 200
  local-session-id 1
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#

Related Commands

no | Resets the MTU size for this manual session to default (1460 bytes)
22.3.5 **no**

- **l2tpv3-manual-session-commands**

Negates or reverts L2TPv3 manual session settings to default

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no [local-cookie|local-ip-address|local-session-id|mtu|peer|remote-cookie|
remote-session-id|traffic-source]
```

**Parameters**

- `no <PARAMETERS>`

---

**Examples**

The following example shows the manual session ‘test’ settings before the ‘no’ commands are executed:

```bash
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context
l2tpv3 manual-session test
  local-ip-address 1.2.3.4
  peer ip-address 5.6.7.8 udp port 150
  traffic-source vlan 50-60 native-vlan 2
  local-session-id 1
  remote-session-id 200
  remote-cookie size 8 400 700
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#
```

The following example shows the manual session ‘test’ settings after the ‘no’ commands are executed:

```bash
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context
l2tpv3 manual-session test
  peer ip-address 5.6.7.8 udp port 150
  traffic-source vlan 50-60 native-vlan 2
  remote-cookie size 8 400 700
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#
```
22.3.6 peer

**l2tpv3-manual-session-commands**

Configures peer(s) allowed to establish the manual session tunnel. The peers are identified by their IP addresses.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

peer ip-address <IP> {udp {port <1-65535>}}

**Parameters**

- peer ip-address <IP> {udp {port <1-65535>}}

<table>
<thead>
<tr>
<th>peer ip-address &lt;IP&gt;</th>
<th>Configures the tunnel’s peer IP address in the A.B.C.D format</th>
</tr>
</thead>
<tbody>
<tr>
<td>udp (port &lt;1-65353&gt;)</td>
<td>Optional. Configures the UDP encapsulation mode for this tunnel (default encapsulation is IP)</td>
</tr>
<tr>
<td></td>
<td>• port &lt;1-65353&gt; – Optional. Configures the peer’s UDP port running the L2TPv3 service.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-65335&gt; – Specify a value from 1 - 65335.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#peer
ip-address 5.6.7.8 udp port 150
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context
l2tpv3 manual-session test
 local-cookie size 8 200 300
 local-ip-address 1.2.3.4
 peer ip-address 5.6.7.8 udp port 150
 mtu 200
 mtu 200
 peer session-id 1
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#
```

**Related Commands**

| no | Removes the manual session’s peer |
22.3.7 remote-cookie

Configures the manual session’s remote cookie field size

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
remote-cookie size [4|8] <1-4294967295> {<1-4294967295>}

Parameters
- remote-cookie size [4|8] <1-4294967295> {<1-4294967295>}

| remote-cookie size [4|8] | Configures the remote cookie field size for this manual session. The options are: |
|--------------------------|----------------------------------------------------------------------------------|
|                          | • 4 – 4 byte remote cookie field |
|                          | • 8 – 8 byte remote cookie field |

<table>
<thead>
<tr>
<th>&lt;1-4294967295&gt;</th>
<th>Configures the remote cookie value first word. Applies to both the 4 byte and 8 byte local cookies</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>&lt;1-4294967295&gt;</th>
<th>Optional – Configures the remote cookie value second word. Applicable to only 8 byte cookies. This parameter is ignored for 4 byte cookies.</th>
</tr>
</thead>
</table>

Examples
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#remote-cookie size 8 400 700
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context l2tpv3 manual-session test
  local-ip-address 1.2.3.4
  peer ip-address 5.6.7.8 udp port 150
  mtu 200
  local-session-id 1
  remote-cookie size 8 400 700
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#

Related Commands
- **no** Removes the manual session’s remote cookie field size
22.3.8 **remote-session-id**

*arrow* l2tpv3-manual-session-commands

Configures the manual session’s remote ID. This ID is passed in the establishment of the tunnel session.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

remote-session-id <1-4294967295>

**Parameters**

- remote-session-id <1-4294967295>

<table>
<thead>
<tr>
<th>remote-session-id &lt;1-4294967295&gt;</th>
<th>Configures this manual session’s remote ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;1-4294967295&gt;</td>
<td>• Specify a value from 1 - 4294967295.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#remote-session-id 200
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context l2tpv3 manual-session test
local-ip-address 1.2.3.4
peer ip-address 5.6.7.8 udp port 150
local-session-id 1
remote-session-id 200
remote-cookie size 8 400 700
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>no</th>
<th>Removes the manual session’s remote ID</th>
</tr>
</thead>
</table>

22.3.9 traffic-source

**l2tpv3-manual-session-commands**

Configures the traffic source tunneled by this session

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

traffic-source vlan <VLAN-ID-RANGE> {native-vlan <1-4094>}

**Parameters**
- traffic-source vlan <VLAN-ID-RANGE> {native-vlan <1-4094>}

<table>
<thead>
<tr>
<th>traffic-source vlan &lt;VLAN-ID-RANGE&gt;</th>
<th>Configures VLAN as the traffic source for this tunnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;VLAN-ID-RANGE&gt; – Configures VLAN range list of traffic source. Specify the VLAN IDs as a range (for example, 10-20, 25, 30-35)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>native-vlan &lt;1-4094&gt;</th>
<th>Optional – Configures the native VLAN ID for this session, which is not tagged</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-4094&gt; – Specify the native VLAN ID from 1- 4094.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#traffic-source vlan 50-60 native-vlan 2

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context l2tpv3 manual-session test
local-ip-address 1.2.3.4
peer ip-address 5.6.7.8 udp port 150
traffic-source vlan 50-60 native-vlan 2
local-session-id 1
temporary-session-id 200
remote-cookie size 8 400 700
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#

**Related Commands**

**no**

Removes the traffic source configured for a tunnel
This chapter summarizes Open Shortest Path First (OSPF) router mode commands in the CLI command structure. All router-mode commands are available on both device and profile modes.

OSPF is an interior gateway protocol (IGP) used within large autonomous systems to distribute routing information. OSPF routes IP packets within a single routing domain (autonomous system), like an enterprise LAN. OSPF gathers link state information from neighbor routers and constructs a network topology. The topology determines the routing table presented to the Internet Layer, which makes routing decisions based solely on the destination IP address found in IP packets.

OSPF detects changes in the topology, like a link failure, and plots a new loop-free routing structure. It computes the shortest path for each route using a shortest path first algorithm. Link state data is maintained on each router and is periodically updated on all OSPF member routers. This enables routers to synchronize routing tables.

OSPF uses a route table managed by the link cost (external metrics) defined for each routing interface. The cost could be the distance of a router (round-trip time), link throughput or link availability.

Use the (config) instance to configure router commands. To navigate to the (config-router-mode) instance, use the following command:

```
<DEVICE>(config-profile-<PROFILE-NAME>)#router ospf
<DEVICE>(config-profile <PROFILE-NAME>-router-ospf)#
```

```
rfs7000-37FABE(config-profile-default-rfs7000)#router ospf
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#
```

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#?
```

Router OSPF Mode commands:
- **area**: OSPF area
- **auto-cost**: OSPF auto-cost
- **default-information**: Distribution of default information
- **ip**: Internet Protocol (IP)
- **network**: OSPF network
- **no**: Negate a command or set its defaults
- **ospf**: OSPF
- **passive**: Make OSPF Interface as passive
- **redistribute**: Route types redistributed by OSPF
- **route-limit**: Limit for number of routes handled OSPF process
- **router-id**: Router ID

- **clrscr**: Clears the display screen
- **commit**: Commit all changes made in this session
- **do**: Run commands from Exec mode
- **exit**: End current mode and change to EXEC mode
- **help**: Description of the interactive help system
revert               Revert changes
service              Service Commands
show                 Show running system information
write                Write running configuration to memory or terminal

rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#

NOTE: The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
23.1 router-mode

The following table summarizes router configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>area</td>
<td>Specifies OSPF enabled interfaces</td>
<td>page 23-4</td>
</tr>
<tr>
<td>auto-cost</td>
<td>Specifies the reference bandwidth in terms of Mbits per second</td>
<td>page 23-13</td>
</tr>
<tr>
<td>default-information</td>
<td>Controls the distribution of default information</td>
<td>page 23-14</td>
</tr>
<tr>
<td>ip</td>
<td>Configures Internet Protocol (IP) default gateway priority</td>
<td>page 23-15</td>
</tr>
<tr>
<td>network</td>
<td>Defines OSPF network settings</td>
<td>page 23-16</td>
</tr>
<tr>
<td>ospf</td>
<td>Enables OSPF</td>
<td>page 23-17</td>
</tr>
<tr>
<td>passive</td>
<td>Specifies the configured OSPF interface as passive interface</td>
<td>page 23-18</td>
</tr>
<tr>
<td>redistribute</td>
<td>Specifies the route types redistributed by OSPF</td>
<td>page 23-19</td>
</tr>
<tr>
<td>route-limit</td>
<td>Specifies the limit for the number of routes managed by OSPF</td>
<td>page 23-20</td>
</tr>
<tr>
<td>router-id</td>
<td>Specifies the router ID for OSPF</td>
<td>page 23-21</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its defaults</td>
<td>page 23-22</td>
</tr>
</tbody>
</table>

NOTE: For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
23.1.1 area

- **router-mode**
  
  Configures OSPF network area (OSPF enabled interfaces) settings
  
  The following table lists the OSPF Area configuration mode commands:

  **Table 23.2 OSPF Area Config Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>area</td>
<td>Creates a new OSPF area and enters its configuration mode</td>
<td>page 23-5</td>
</tr>
<tr>
<td>OSPF-area-mode</td>
<td>Summarizes OSPF area configuration commands</td>
<td>page 23-7</td>
</tr>
</tbody>
</table>
23.1.1.1 area

```
area
```

Configures OSPF network areas (OSPF enables interfaces)

An OSPF network can be subdivided into routing areas to simplify administration and optimize traffic utilization. Areas are logical groupings of hosts and networks, including routers having interfaces connected to an included network. Each area maintains a separate link state database whose information may be summarized towards the rest of the network by the connecting router. Areas are identified by 32-bit IDs, expressed either in decimal, or octet-based dot-decimal notation. Areas can defined as: stub area, totally-stub, non-stub, nssa, totally nssa. Each of these area types have been discussed further in the area-type section of this chapter.

At least one default area, bearing number '0', should be configured for every OSPF network. In case of multiple areas, the default area 0 forms the backbone of the network. The default area 0 is used as a link to the other areas. Each area has its own link-state database.

A router running OSPF sends hello packets to discover neighbors and elect a designated router. The hello packet includes link state information and list of neighbors. OSPF is savvy with layer 2 topologies. If on a point-to-point link, OSPF knows it is sufficient, and the link stays up. If on a broadcast link, the router waits for election before determining if the link is functional.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```
area [<0-4294967295>|<IP>]
```

**Parameters**

- **area [0-4294967295]|<IP>**

<table>
<thead>
<tr>
<th>area</th>
<th>Defines an OSPF area</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-4294967295&gt;</td>
<td>Defines an OSPF area in the form of a 32 bit integer</td>
</tr>
<tr>
<td>• &lt;0-4294967295&gt; – Specify the value from 0 - 4294967295.</td>
<td></td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>Defines an OSPF area in the form of an IP address</td>
</tr>
<tr>
<td>• &lt;IP&gt; – Specify the IP address.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#area 4 ?
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.4)#?
```

**Router OSPF Area Mode commands:**

- **area-type** OSPF area type
- **authentication** Authentication scheme for OSPF area
- **no** Negate a command or set its defaults
- **range** Routes matching this range are considered for summarization (ABR only)
- **clrscr** Clears the display screen
- **commit** Commit all changes made in this session
- **do** Run commands from Exec mode
- **end** End current mode and change to EXEC mode
- **exit** End current mode and down to previous mode
- **help** Description of the interactive help system
- **revert** Revert changes
- **service** Service Commands
- **show** Show running system information
- **write** Write running configuration to memory or terminal

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.4)#
```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.4)# show context area 0.0.0.4
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.4)#

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes area configuration settings</td>
</tr>
</tbody>
</table>
23.1.1.2 OSPF-area-mode

The following table summarizes OSPF area mode configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>area-type</td>
<td>Configures a particular OSPF area as STUB or NSSA</td>
<td>page 23-8</td>
</tr>
<tr>
<td>authentication</td>
<td>Specifies the authentication scheme used for the OSPF area</td>
<td>page 23-10</td>
</tr>
<tr>
<td>range</td>
<td>Specifies the routes matching address/mask for summarization</td>
<td>page 23-11</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its defaults</td>
<td>page 23-12</td>
</tr>
</tbody>
</table>
### 23.1.1.2.1 area-type

**OSPF-area-mode**

Configures a particular OSPF area type as STUB, Totally STUB, NSSA or Totally NSSA.

Areas can be defined as:

- **stub area** - Is an area that does not receive route advertisements external to the autonomous system (AS), and routing from within the area is based entirely on a default route.
- **totally-stub** - Is an area that does not allow summary routes and external routes. A default route is the only way to route traffic outside of the area. When there is only one route out of the area, fewer routing decisions are needed, lowering system resource utilization.
- **non-stub** - Is an area that imports autonomous system external routes and forwards to other areas. However, it still cannot receive external routes from other areas.
- **nssa** - A Not-So-Stubby Area (NSSA) is an extension of a stub that allows the injection of limited external routes into a stub area. If selecting NSSA, no external routes, except a default route, enter the area.
- **totally-nssa** - Is a NSSA using 3 and 4 summary routes are not flooded into this type of area. It is also possible to declare an area both totally stubby and not-so-stubby, which means that the area will receive only the default route from area 0.0.0.0, but can also contain an Autonomous System Boundary Router (ASBR) that accepts external routing information and injects it into the local area, and from the local area into area 0.0.0.0.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6552, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```
area-type [nssa|stub]

area-type nssa {default-cost|no-summary|translate-always|translate-candidate|translate-never}

area-type nssa {default-cost <0-16777215> {no-summary}|no-summary {default-cost <0-16777215>}}

area-type nssa {translate-always|translate-candidate|translate-never}
{(default-cost <0-16777215>|no-summary)}

area-type stub {default-cost <0-16777215> {no-summary}|no-summary {default-cost <0-16777215>}}
```

**Parameters**

- **area-type [nssa|stub]{default-cost|no-summary|translate-always|translate-candidate|translate-never}**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>area-type</td>
<td>Configures a particular OSPF area type as STUB, Totally STUB, NSSA or Totally NSSA</td>
</tr>
<tr>
<td>nssa</td>
<td>Configures the OSPF area as NSSA</td>
</tr>
<tr>
<td>stub</td>
<td>Configures the OSPF area as Stubby Area (STUB)</td>
</tr>
<tr>
<td>default-cost</td>
<td>Specifies the default summary cost that will be advertised, if the OSPF area is a STUB or NSSA.</td>
</tr>
<tr>
<td>&lt;0-16777215&gt;</td>
<td>• <code>&lt;0-16777215&gt;</code> — Specify the default summary cost value from 0 - 16777215.</td>
</tr>
<tr>
<td>no-summary</td>
<td>Configures the OSPF area as totally STUB if the area-type is STUB or totally NSSA if the area-type is NSSA.</td>
</tr>
<tr>
<td>translate-always</td>
<td>Always translates type-7 Link State Advertisements (LSAs) into type-5 LSAs</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>translate-candidate</td>
<td>Defines it as default behavior</td>
</tr>
<tr>
<td>translate-never</td>
<td>Never translates type-7 LSAs into type-5 LSAs</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#area-type stub
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#show context
  area 0.0.0.1
    area-type stub default-cost 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes configured area-type settings</td>
</tr>
</tbody>
</table>
23.1.1.2.2 authentication

**OSPF-area-mode**

Specifies an authentication scheme used for an OSPF area used with the OSPF dynamic route

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

authentication [message-digest|simple-password]

**Parameters**

- authentication [message-digest|simple-password]

<table>
<thead>
<tr>
<th>message-digest</th>
<th>Configures the message-digest (MD-5) authentication scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>simple-password</td>
<td>Configures the simple password authentication scheme</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

OSPF packet authentication enables routers to use predefined passwords and participate within a routing domain. The two authentication modes are:

- **MD-5** – MD-5 authentication is a cryptographic authentication mode, where every router has a key (password) and key-id configured on it. This key and key-id together form the message digest that is appended to the OSPF packet.
- **Simple Password** – Simple password authentication allows a password (key) to be configured per area. Routers in the same area and participating in the routing domain have to be configured with the same key.

**Examples**

rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#authentication simple-password

rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#show context area 0.0.0.1
  authentication simple-password
  area-type stub default-cost 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#

**Related Commands**

- **no** Removes the authentication scheme
23.1.1.2.3 range

![OSPF-area-mode](image)

Specifies a range of addresses for routes matching address/mask for OSPF summarization

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

range <IP/M>

**Parameters**
- range <IP/M>

<table>
<thead>
<tr>
<th>&lt;IP/M&gt;</th>
<th>Specifies the routes matching address/mask for summarization.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note:</td>
<td>This command is applicable for a <em>Area Border Router</em> (ABR) only.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#range 172.16.10.0/24

rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#show context area 0.0.0.1
  authentication simple-password
  range 172.16.10.0/24
  area-type stub default-cost 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#

**Related Commands**

| no       | Removes the configured network IP range |
23.1.1.2.4 no

- **OSPF-area-mode**

  Negates a command or set its defaults

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```
no [area-type|authentication|range]
```

**Parameters**

- `no <PARAMETERS>`

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Negates a command or set its defaults</th>
</tr>
</thead>
</table>

**Usage Guidelines**

The `no` command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

**Examples**

The following example shows the OSPF router settings before the 'no' commands are executed:

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#show context area 0.0.0.1
  authentication simple-password
  range 172.16.10.0/24
  area-type stub default-cost 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#
```

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#no authentication
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#no range 172.16.10.0/24
```

The following example shows the OSPF router settings after the 'no' commands are executed:

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#show context area 0.0.0.1
  area-type stub default-cost 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#```
23.1.2 auto-cost

router-mode

Configures the reference bandwidth in terms of megabits per second. Specifying the reference bandwidth allows you to control the default metrics for an interface, which is calculated by OSPF.

The formula used to calculate default metrics is: \( \text{ref-bw} \) divided by the \( \text{bandwidth} \).

Use the ‘no > auto-cost > reference-bandwidth’ command to configure default metrics calculation based on interface type.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax

auto-cost reference-bandwidth <1-4294967>

Parameters

- \( \text{auto-cost reference-bandwidth} \) <1-4294967>

<table>
<thead>
<tr>
<th>reference-bandwidth &lt;1-4294967&gt;</th>
<th>Defines the reference bandwidth in Mbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;1-4294967&gt;</td>
<td>– Specify the reference bandwidth value from 1 - 4294967.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#auto-cost reference-bandwidth 1

Ensure that the auto-cost reference-bandwidth is configured uniformly on all routers.

rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#

rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context router ospf
area 0.0.0.4
  auto-cost reference-bandwidth 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#

Related Commands

no

Removes auto-cost reference bandwidth settings
23.1.3 default-information

- router-mode

Controls the distribution of default route information. Use the `default-information > originate` command to advertise a default route in the routing table.

This option is disabled by default. When enabled, the default route becomes a distributed route.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```
default-information originate {always|metric|metric-type}
default-information originate {always|metric <0-16777214>|metric-type [1|2]}
```

**Parameters**

- **always**
  - Optional. Always distributes default route information (will continue to advertise default route information even if that information has been removed from the routing table for some reason). This option is disabled by default.

- **metric <0-16777214>**
  - This is a recursive parameter and can be optionally configured along with the metric-type option.
    - **metric <0-16777214>** – Optional. Specifies OSPF metric value for redistributed routes (this value is used to generate the default route)
    - **<0-16777214>** – Specify a value from 0 - 16777214.

- **metric-type [1|2]**
  - This is a recursive parameter and can be optionally configured along with the metric option.
    - **metric-type [1|2]** – Optional. Sets OSPF exterior metric type for redistributed routes (this information is advertised with the OSPF routing domain)
      - **1** – Sets OSPF external type 1 metrics
      - **2** – Sets OSPF external type 2 metrics

**Examples**

```plaintext
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#default-information originate metric-type 2 metric 1
```

**Related Commands**

- `no`
  - Disables advertising of default route information available in the routing table
23.1.4 ip

router-mode

Configures IP default gateway priority

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax

ip default-gateway priority <1-8000>

Parameters

- ip default-gateway priority <1-8000>

<table>
<thead>
<tr>
<th>default-gateway</th>
<th>Configures the default gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td>priority &lt;1-8000&gt;</td>
<td>Sets the priority for the default gateway acquired via OSPF</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-8000&gt; – Specify an integer from 1 - 8000. The default is 7000.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: Lower the value, higher is the priority.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#ip default-gateway priority 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context router ospf
    area 0.0.0.4
    auto-cost reference-bandwidth 1
    default-information originate metric 1 metric-type 2
    ip default-gateway priority 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#

Related Commands

| no                | Removes default gateway priority settings |
23.1.5 network

Assigns networks to specified areas (defines the OSPF interfaces and their associated area IDs)

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax
network <IP/M> area [<0-4294967295>|<IP>]

Parameters
- network <IP/M> area [<0-4294967295>|<IP>]

| <IP/M> | Specifies an OSPF network address/mask value. Defines networks (IP addresses and mask) participating in OSPF. |
| area [<0-4294967295]|<IP>] | Specifies an OSPF area, associated with the OSPF address range, in one of the following formats:  
  - <0-4294967295> – Specifies a 32 bit OSPF area ID from 0 - 4294967295  
  - <IP> – Defines an OSPF area ID in the form of an IPv4 address |

Examples
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#network 1.2.3.0/24 area 4.5.6.7
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context router ospf
  network 1.2.3.0/24 area 4.5.6.7
  area 0.0.0.4
  auto-cost reference-bandwidth 1
  default-information originate metric 1 metric-type 2
  ip default-gateway priority 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#

Related Commands
- no | Removes the OSPF network to area ID association |
23.1.6 ospf

`router-mode`

Enables OSPF routing on a profile or device

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

`ospf enable`

**Parameters**

- `ospf enable`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ospf enable</code></td>
<td>Enables OSPF routing on devices using this profile. This option is disabled by default.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#ospf enable

rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context
rfs7000-37FABE(config-profile default-rfs7000-router-ospf) router ospf
   ospf enable
   network 1.2.3.0/24 area 4.5.6.7
   area 0.0.0.4
   auto-cost reference-bandwidth 1
   default-information originate metric 1 metric-type 2
   ip default-gateway priority 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#
```

**Related Commands**

- `no` Disables OSPF routing on a profile or device
23.1.7 passive

**router-mode**

Configures specified OSPF interface as passive. This option is disabled by default.

A passive interface receives routing updates, but does not transmit them.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```
passive [WORD]|all|vlan <1-4094>
```

**Parameters**

- `passive [WORD]|all|vlan <1-4094>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>WORD</code></td>
<td>Enables the OSPF passive mode on the interface specified by the <code>WORD</code> parameter</td>
</tr>
<tr>
<td><code>all</code></td>
<td>Enables the OSPF passive mode on all the L3 interfaces</td>
</tr>
<tr>
<td><code>vlan &lt;1-4094&gt;</code></td>
<td>Enables the OSPF passive mode on the specified VLAN interface</td>
</tr>
<tr>
<td><code>&lt;1-4094&gt;</code></td>
<td>Specify the VLAN interface ID from 1 - 4094</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#passive vlan 1
```

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context router ospf
  ospf enable
  network 1.2.3.0/24 area 4.5.6.7
  area 0.0.0.4
  auto-cost reference-bandwidth 1
  default-information originate metric 1 metric-type 2
  passive vlan1
  ip default-gateway priority 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables the OSPF passive mode on a specified interface</td>
</tr>
</tbody>
</table>
23.1.8 *redistribute*

- **router-mode**

Specifies the route types redistributed by OSPF.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

redistribute [bgp|connected|kernel|static] {metric <0-16777214>|metric-type [1|2]}

**Parameters**

- redistribute [connected|kernel|static] {metric <0-16777214>|metric-type [1|2]}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bgp</td>
<td>Redistributes all BGP routes by OSPF</td>
</tr>
<tr>
<td>connected</td>
<td>Redistributes all connected interface routes by OSPF</td>
</tr>
<tr>
<td>kernel</td>
<td>Redistributes all routes that are neither connected, static, dynamic, nor bgp</td>
</tr>
<tr>
<td>static</td>
<td>Redistributes static routes by OSPF</td>
</tr>
<tr>
<td>metric &lt;0-16777214&gt;</td>
<td>The following keywords are common to the ‘bgp’, ‘connected’, ‘kernel’, and ‘static’ parameters:</td>
</tr>
<tr>
<td></td>
<td>• metric &lt;0-16777214&gt; – Optional. Specifies the OSPF metric value for redistributed routes.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-16777214&gt; – Specify a value from 0 - 16777214.</td>
</tr>
<tr>
<td>metric-type [1</td>
<td>2]</td>
</tr>
<tr>
<td></td>
<td>• metric-type [1</td>
</tr>
<tr>
<td></td>
<td>• 1 – Sets the OSPF external type 1 metrics</td>
</tr>
<tr>
<td></td>
<td>• 2 – Sets the OSPF external type 2 metrics</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#redistribute static metric-type 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context
router ospf
  ospf enable
  network 1.2.3.0/24 area 4.5.6.7
  area 0.0.0.4
  auto-cost reference-bandwidth 1
  default-information originate metric 1 metric-type 2
  redistribute static metric-type 1
  passive vlan1
  ip default-gateway priority 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the OSPF redistribution of various route types</td>
</tr>
</tbody>
</table>
### 23.1.9 route-limit

Limits the number of routes managed by OSPF. The maximum limit supported by the platform is the default configuration defined under the router-ospf context.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```
route-limit [num-routes|reset-time|retry-count|retry-timeout]
```

```
route-limit [num-routes <DYNAMIC-ROUTE-LIMIT>|reset-time <1-86400>|retry-count <1-32>|retry-timeout <1-3600>] {(num-routes|reset-time|retry-count|retry-timeout)}
```

**Parameters**

- `num-routes` Specifies the maximum number of non self-generated LSAs this process can receive
  - `<DYNAMIC-ROUTE-LIMIT>` — Specify the dynamic route limit.

- `reset-time <1-86400>` Specifies the time, in seconds, after which the retry-count is reset to zero
  - `<1-86400>` — Specify a value from 1 - 86400 seconds. The default is 360 seconds.

- `retry-count <1-32>` Specifies the maximum number of times adjacencies can be suppressed. Each time OSPF gets into an ignore state, a counter increments. If the counter exceeds the timeout configured by the retry-count parameter, OSPF stays in the same ignore state. Manual intervention is required to get OSPF out of the ignore state.
  - `<1-32>` — Specify a value from 1 - 32. The default is 5.

- `retry-timeout <1-3600>` Specifies the retry time in seconds. During this time, OSPF remains in ignore state and all adjacencies are suppressed.
  - `<1-3600>` — Specify a value from 1 - 3600 seconds. The default is 60 seconds.

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#route-limit num-routes 10 retry-count 5 retry-timeout 60 reset-time 10
```

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context router ospf
ospf enable
network 1.2.3.0/24 area 4.5.6.7
area 0.0.0.4
auto-cost reference-bandwidth 1
default-information originate metric 1 metric-type 2
redistribute static metric-type 1
passive vlan1
route-limit num-routes 10 retry-count 5 retry-timeout 60 reset-time 10
ip default-gateway priority 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#
```

**Related Commands**

```
no
```

Removes the limit on the number of routes managed by OSPF
23.1.10 `router-id`

`router-mode`

Specifies the OSPF router ID

This ID must be established in every OSPF instance. If not explicitly configured, the highest logical IP address is duplicated as the router identifier. However, since the router identifier is not an IP address, it does not have to be a part of any routable subnet in the network.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

`router-id <IP>`

**Parameters**

- `router-id <IP>`

<table>
<thead>
<tr>
<th><code>&lt;IP&gt;</code></th>
<th>Identifies the OSPF router by its IP address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;IP&gt;</code> – Specify the router ID in the IP <code>&lt;A.B.C.D&gt;</code> format</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#router-id 172.16.10.8
```

Reload, or execute "clear ip ospf process" command, for this to take effect

```bash
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#
```

**Related Commands**

- `no` Removes the configured OSPF router ID
### 23.1.11 `no`

Negates a command or reverts settings to their default

**Supported in the following platforms:**

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000

#### Syntax

`no [area|auto-cost|default-information|ip|network|ospf|passive|redistribute|required-limit|router-id]`

#### Parameters

- `no <PARAMETERS>`

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Negates a command or set its defaults</th>
</tr>
</thead>
</table>

#### Usage Guidelines

The `no` command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

#### Examples

The following example shows the OSPF router interface settings before the 'no' commands are executed:

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context router ospf
  network 1.2.3.0/24 area 4.5.6.7
  area 0.0.0.4
  auto-cost reference-bandwidth 1
  default-information originate metric 1 metric-type 2
  redistribute static metric-type 1
  passive vlan1
  route-limit num-routes 10 reset-time 10
  ip default-gateway priority 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#
```

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#no area 4
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#no auto-cost reference-bandwidth
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#no network 1.2.3.0/24 area 4.5.6.7
```

The following example shows the OSPF router interface settings after the 'no' commands are executed:

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context router ospf
  default-information originate metric 1 metric-type 2
  redistribute static metric-type 1
  passive vlan1
  route-limit num-routes 10 reset-time 10
  ip default-gateway priority 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#
```
CHAPTER 24
ROUTING-POLICY

This chapter summarizes routing-policy commands in the CLI command structure.

Routing policies enable network administrators to control data packet routing and forwarding. Policy-based routing (PBR) always overrides protocol-based routing. Network administrators can define routing policies based on parameters, such as access lists, packet size, etc. For example, a routing policy can be configured to route packets along user-defined routes.

In addition to the above, PBR facilitates the provisioning of preferential service to specific traffic. PBR minimally provides the following:

- A means to use source address, protocol, application, and traffic class as traffic routing criteria
- A means to load balance multiple WAN uplinks
- A means to selectively mark traffic for Quality of Service (QoS) optimization

Use the (config) instance to configure router-policy commands. To navigate to the (config-routing-policy mode) instance, use the following commands:

```plaintext
<DEVICE>(config)#routing-policy <ROUTING-POLICY-NAME>

rfs7000-37FABE(config)#routing-policy testpolicy
rfs7000-37FABE(config-routing-policy-testpolicy)#?

Routing Policy Mode commands:
apply-to-local-packets  Use Policy Based Routing for packets generated by
                        the device
logging                 Enable logging for this Route Map
no                      Negate a command or set its defaults
route-map               Create a Route Map
use                     Set setting to use
clrscr                  Clears the display screen
commit                  Commit all changes made in this session
do                      Run commands from Exec mode
end                     End current mode and change to EXEC mode
exit                    End current mode and down to previous mode
help                    Description of the interactive help system
revert                  Revert changes
service                 Service Commands
show                    Show running system information
write                   Write running configuration to memory or terminal

rfs7000-37FABE(config-routing-policy-testpolicy)#
```
NOTE: The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
ROUTING-POLICY 24-3

24.1 routing-policy-commands

The following table summarizes routing policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>apply-to-local-packets</td>
<td>Enables PBR for locally generated packets</td>
<td>page 24-4</td>
</tr>
<tr>
<td>logging</td>
<td>Enables logging for a specified route map</td>
<td>page 24-5</td>
</tr>
<tr>
<td>route-map</td>
<td>Creates a route map entry</td>
<td>page 24-6</td>
</tr>
<tr>
<td>use</td>
<td>Defines default settings to use</td>
<td>page 24-16</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its defaults</td>
<td>page 24-17</td>
</tr>
</tbody>
</table>

NOTE: For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
### 24.1.1 apply-to-local-packets

#### routing-policy-commands

Enables PBR for locally generated packets (packets generated by the device). When enabled, this option implements the match and action clauses defined within route maps. This option is enabled by default.

To disable PBR, use the `no apply-to-local-packets` command.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
apply-to-local-packets
```

**Parameters**

None

**Examples**

```plaintext
rfs7000-37FABE(config-routing-policy-testpolicy)#apply-to-local-packets
rfs7000-37FABE(config-routing-policy-testpolicy)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables PBR for locally generated packets</td>
</tr>
</tbody>
</table>
24.1.2 logging

- **routing-policy-commands**

  Enables logging for a specified route map. When enabled, this option logs events generated by the enforcement of route-maps. This option is disabled by default.

  Supported in the following platforms:

  - Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

  **Syntax**

  logging

  **Parameters**

  None

  **Examples**

  rfs7000-37FABE(config-routing-policy-testpolicy)#logging

  rfs7000-37FABE(config-routing-policy-testpolicy)#show context routing-policy testpolicy logging

  rfs7000-37FABE(config-routing-policy-testpolicy)#

  **Related Commands**

  | no | Disables route map logging |
24.1.3 route-map

Creates a route map entry and enters the route map configuration mode

In policy-based routing (PBR), route maps control the flow of traffic within the network. They override route tables and direct traffic along a specific path.

Route-maps contain a set of filters that select traffic (match clauses) and associated actions (mark clauses) for routing. Every route-map entry has a precedence value. Lower the precedence, higher is the route-map’s priority. All incoming packets are matched against these route-maps entries. The route-map entry with highest precedence (lowest numerical value) is applied first. In case of a match, action is taken based on the mark clause specified in the route-map. In case of no match, the route-map entry with the next highest precedence is applied. If the incoming packet does not match any of the route-map entries, it is subjected to typical destination-based routing. Each route-map entry can optionally enable/disable logging.

The following criteria can optionally be used as traffic selection segregation criteria:

- **IP Access List** - A typical IP ACL can be used for routing traffic. The mark and log actions in ACL rules however are neglected. Route-map entries have separate logging. Only one ACL can be configured per route map entry.
  ACL rules configured under route map entries merge to create a single ACL. Route map precedence values determine the prioritization of the rules in this merged ACL. An IP DSCP value is also added to the ACL rules.

- **IP DSCP** - Packet filtering can be performed by traffic class, as determined from the IP Differentiated Services Code Point (DSCP) field. One DSCP value can be configured per route map entry. If IP ACLs on a WLAN, ports or SVI mark packets, the new/marked DSCP value is used for matching.

- **Incoming WLAN** - Packets can be filtered on the basis of the incoming WLAN. Depending on whether the receiving device has an onboard radio or not, the following two scenarios are possible:
  - Device with an onboard radio: If a device having an onboard radio and capable of PBR receives a packet on a local WLAN, this WLAN is used for selection.
  - Device without an onboard radio: If a device, without an onboard radio, capable of PBR receives a packet from an extended VLAN, it passes the WLAN information in the MiNT packet to the PBR router. The PBR router uses this information as match criteria.

- **Client role** - The client role can be used as match criteria, similar to a WLAN. Each device has to agree on a unique identifier for role definition and pass the same MiNT tunneled packets.

- **Incoming SVI** - A source IP address qualifier in an ACL typically satisfies filter requirements. But if the source host (where the packet originates) is multiple hops away, the incoming SVI can be used as match criteria. In this context the SVI refers to the device interface performing PBR, and not to the source device.

Mark (or action) clauses determine the routing function when a packet satisfies match criteria. If no mark clauses are defined, the default is to fallback to destination-based routing for packets satisfying the match criteria. If no mark clause is configured and fallback to destination-based routing is disabled, then the packet is dropped. The mark clause defines one of following actions:

- **Next hop** - The IP address of the next hop or the outgoing interface through which the packet should be routed. Up to two next hops can be specified. The outgoing interface should be a PPP, a tunnel interface or a SVI which has DHCP client configured. The first reachable hop should be used. But if all next hops are unreachable, typical destination-based route lookup is performed.

- **Default next hop** - If a packet subjected to PBR does not have an explicit route to the destination, the configured default next hop is used. This can be either the IP address of the next hop or the outgoing interface. Only one default next hop can be defined. The difference between the next hop and the default next-hop is: in case of the former, PBR occurs first, then destination-based routing. In case of the latter, the order is reversed. In both cases:
  a. If a defined next hop is reachable, it is used. If fallback is configured refer to (b).
  b. Perform normal destination-based route lookup. If a next hop is found, it is used, if not refer to (c).
  c. If default next hop is configured and reachable, it is used, if not, packet is dropped.
• **Fallback** - Enables fallback to destination-based routing if none of the configured next hops are reachable (or not configured). This is enabled by default.

• **Mark IP DSCP** - Configures IP DSCP bits for QoS using an ACL. The mark action of the route maps takes precedence over the mark action of an ACL.

Supported in the following platforms:
- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**
route-map <1-100>

**Parameters**
- **route-map <1-100>** Creates a route map entry, sets a precedence value for the route map, and enters the route map configuration mode
  - `<1-100>` – Specify a precedence value from 1 - 100.
  - **Note:** Lower the sequence number, higher is the precedence.

**Examples**
rfs7000-37FABE(config-routing-policy-testpolicy)#route-map 1

rfs7000-37FABE(config-routing-policy-testpolicy)#show context
routing-policy testpolicy
logging
route-map 1
rfs7000-37FABE(config-routing-policy-testpolicy)#

rfs7000-37FABE(config-routing-policy-testpolicy)#route-map 1
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#?

**Route Map Mode commands:**
- **default-next-hop** Default next-hop configuration (aka gateway-of-last-resort)
- **fallback** Fallback to destination based routing if no next-hop is configured or all are unreachable
- **mark** Mark action for route map
- **match** Match clause configuration for Route Map
- **next-hop** Next-hop configuration
- **no** Negate a command or set its defaults
- **clrscr** Clears the display screen
- **commit** Commit all changes made in this session
- **do** Run commands from Exec mode
- **end** End current mode and change to EXEC mode
- **exit** End current mode and down to previous mode
- **help** Description of the interactive help system
- **revert** Revert changes
- **service** Service Commands
- **show** Show running system information
- **write** Write running configuration to memory or terminal

rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#

**Related Commands**

| no | Removes a route map |
24.1.4 route-map-mode

The following table summarizes route-map configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>default-next-hop</td>
<td>Sets the default next hop for packets satisfying match criteria</td>
<td>page 24-9</td>
</tr>
<tr>
<td>fallback</td>
<td>Configures a fallback to the next destination</td>
<td>page 24-10</td>
</tr>
<tr>
<td>mark</td>
<td>Marks action clause for packets satisfying match criteria</td>
<td>page 24-11</td>
</tr>
<tr>
<td>match</td>
<td>Sets match clauses for the route map</td>
<td>page 24-12</td>
</tr>
<tr>
<td>next-hop</td>
<td>Sets the next hop for packets satisfying match criteria</td>
<td>page 24-14</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 24-15</td>
</tr>
</tbody>
</table>
### 24.1.4.1 default-next-hop

#### route-map-mode

Sets the default next hop for packets satisfying match criteria.

If a packet, subjected to PBR, does not have an explicit route to the destination, the configured default next hop is used. This value is set as either the IP address of the next hop or the outgoing interface. Only one default next hop can be defined. The difference between the next hop and the default next-hop is: in case of the former, PBR occurs first, then destination-based routing. In case of the latter, the order is reverse. Use this command to set either the default next hop IP address or define either a WWAN1, PPPoE1, or VLAN interface.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

#### Syntax

default-next-hop [<IP>|<ROUTER-IF-NAME>|pppoe1|serial <SLOT-ID> <PORT-ID> <CHANNEL-GROUP-ID>|vlan <1-4094>|wwan1]

#### Parameters
- **<IP>**: Specifies next hop router’s IP address.
- **<ROUTER-IF-NAME>**: Specifies the outgoing interface name (router interface name).
- **pppoe1**: Specifies the PPPoE interface.
- **serial <SLOT-ID> <PORT-ID> <CHANNEL-GROUP-ID>**: Specifies the serial interface’s slot, port, and channel group IDs.
- **vlan <1-4094>**: Specifies a VLAN interface ID. *<1-4094>* – Specify a value from 1 - 4094.
- **wwan1**: Specifies the WAN interface.

#### Examples

rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#default-next-hop wwan1

rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#show context route-map 1
default-next-hop wwan1

rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#

#### Related Commands

*no* Removes default next hop router settings.
24.1.4.2 fallback

*route-map-mode*

Enables fallback to destination-based routing. This option is enabled by default. To disable fallback, use the `no fallback` command.

The action taken for packets satisfying the match criteria is determined by the mark (action) clauses. If no action is defined, the default is to fallback to destination-based routing.

**NOTE:** If no mark clause is configured and fallback to destination-based routing is disabled, then the packet is dropped.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
fallback
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#fallback
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables fallback to destination-based routing, if no next hop is configured or are unreachable</td>
</tr>
</tbody>
</table>
24.1.4.3 mark

Enables the marking of the DSCP field in the IP header.

Use this command to set the IP DSCP bits for QoS using an ACL. The mark action of the route maps takes precedence over the mark action of an ACL.

The DSCP field in an IP header enables packet classification. Packet filtering can be done based on traffic class, determined from the IP DSCP field. One DSCP value can be configured per route map entry.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
mark ip dscp <0-63>
```

Parameters

- `mark ip dscp <0-63>`

Examples

```
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#mark ip dscp 7
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#show context route-map 1
default-next-hop wwan1
   mark ip dscp 7
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#
```

Related Commands

- `no` Disables marking of IP packets
24.1.4.4 match

Sets the match clauses

Each route map entry has a set of match clauses used to segregate and filter packets. Packets can be segregated using any one of the following criteria:

- **IP Access List** - A typical IP ACL can be used for routing traffic. The mark and log actions in ACL rules however are neglected. Route-map entries have separate logging. Only one ACL can be configured per route map entry. ACL rules configured under route map entries merge to create a single ACL. Route map precedence values determine the prioritization of the rules in this merged ACL. An IP DSCP value is also added to the ACL rules.

- **IP DSCP** - Packet filtering can be performed by traffic class, as determined from the IP Differentiated Services Code Point (DSCP) field. One DSCP value can be configured per route map entry. If IP ACLs on a WLAN, ports or SVI mark packets, the new/marked DSCP value is used for matching.

- **Incoming WLAN** - Packets can be filtered on the basis of the incoming WLAN. Depending on whether the receiving device has an onboard radio or not, the following two scenarios are possible:
  - Device *with* an onboard radio: If a device having an onboard radio and capable of PBR receives a packet on a local WLAN, this WLAN is used for selection.
  - Device *without* an onboard radio: If a device, without an onboard radio, capable of PBR receives a packet from an extended WLAN, it passes the WLAN information in the MiNT packet to the PBR router. The PBR router uses this information as match criteria.

- **Client role** - The client role can be used as match criteria, similar to a WLAN. Each device has to agree on a unique identifier for role definition and pass the same MiNT tunneled packets.

- **Incoming SVI** - A source IP address qualifier in an ACL typically satisfies filter requirements. But if the source host (where the packet originates) is multiple hops away, the incoming SVI can be used as match criteria. In this context the SVI refers to the device interface performing PBR, and not to the source device.

The action taken for filtered packets is determined by the mark (action) clauses. If no action is defined, the default is to fallback to destination-based routing for packets satisfying the match criteria. For more information on configuring mark clauses, see *mark*. And for more information on fallback action, see *fallback*.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8532
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
match [incoming-interface|ip|ip-access-list|wireless-client-role|wlan]

match incoming-interface [<ROUTER-IF-NAME>|pppoe1|serial <SLOT-ID> <PORT-ID> <CHANNEL-GROUP-ID>|vlan <1-4094>|wwan1]
match ip dscp <0-63>
match ip-access-list <IP-ACCESS-LIST-NAME>
match wireless-client-role <ROLE-POLICY-NAME> <ROLE-NAME>
match wlan <WLAN-NAME>
```

**Parameters**

- `match incoming-interface [<ROUTER-IF-NAME>|pppoe1|serial <SLOT-ID> <PORT-ID> <CHANNEL-GROUP-ID>|vlan <1-4094>|wwan1]`

<table>
<thead>
<tr>
<th>incoming-interface</th>
<th>Sets the incoming SVI match clause. Specify an interface name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;ROUTER-IF-NAME&gt;</td>
<td>Specifies the layer 3 interface name (route interface)</td>
</tr>
<tr>
<td>pppoe1</td>
<td>Specifies the PPP over Ethernet interface</td>
</tr>
</tbody>
</table>
```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>serial &lt;SLOT-ID&gt; &lt;PORT-ID&gt; &lt;CHANNEL-GROUP-ID&gt;</td>
<td>Specifies the serial interface’s slot, port, and channel group IDs.</td>
</tr>
</tbody>
</table>
| vlan <1-4094> | Specifies the VLAN interface ID  
  • <1-4094> – Specify a VLAN ID from 1 - 4094. |
| wwan1 | Specifies the WAN interface name |
| • match ip dscp <0-63> | Sets the DSCP match clause  
  • <0-63> – Specify a value from 0 - 63. The defined DSCP value is used as a matching clause for this route map. |
| ip dscp <0-63> | Sets the DSCP match clause  
  • <0-63> – Specify a value from 0 - 63. The defined DSCP value is used as a matching clause for this route map. |
| • match ip-access-list <IP-ACCESS-LIST-NAME> | Sets the match clause using a pre-configured IP access list  
  • <IP-ACCESS-LIST-NAME> – Specify a pre-configured IP access list name. |
| ip-access-list <IP-ACCESS-LIST-NAME> | Sets the match clause using a pre-configured IP access list  
  • <IP-ACCESS-LIST-NAME> – Specify a pre-configured IP access list name. |
| • match wireless-client-role <ROLE-POLICY-NAME> <ROLE-NAME> | Sets the wireless client role match clause  
  • <ROLE-POLICY-NAME> – Specify a pre-configured role policy.  
  • <ROLE-NAME> – Specify a pre-configured role within it. |
| wlan <WLAN-NAME> | Sets the incoming WLAN match clause  
  • <WLAN-NAME> – Specify a WLAN name. |

**Examples**
```
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#match incoming-interface pppoe1
```
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#show context route-map 1
  match incoming-interface pppoe1
  default-next-hop wwan1
  mark ip dscp 7
```
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#

**Related Commands**
```
no | Disables match clause settings for this route map
```
24.1.4.5 next-hop

Sets the next hop for packets satisfying match criteria

This command allows you to configure the primary and secondary hop priority requests.

Define the primary and secondary hop settings. When defined, the primary hop resource is used with no additional considerations when ever it is available.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

next-hop {<IP>|<ROUTER-IF-NAME>|pppoe1|serial <SLOT-ID> <PORT-ID> <CHANNEL-GROUP-ID>|vlan <1-4094>|wwlan1}

Parameters

- next-hop {<IP>|<ROUTER-IF-NAME>|pppoe1|serial <SLOT-ID> <PORT-ID> <CHANNEL-GROUP-ID>|vlan <1-4094>|wwlan1}

Examples

rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#next-hop vlan 1

rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#show context
route-map 1
  match incoming-interface pppoe1
  next-hop vlan1
  default-next-hop wwan1
  mark ip dscp 7

Related Commands

no

Disables the next hop router settings
24.1.6 **no**

Negates a command or sets its defaults

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```bash
no [default-next-hop|fallback|mark|match|next-hop]
```

**Parameters**

- **no <PARAMETERS>**

| no <PARAMETERS> | Negates a command or set its defaults |

**Usage Guidelines**

The **no** command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

**Examples**

The following example shows the route-map ‘1’ settings before the ‘no’ commands are executed:

```bash
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#show context route-map 1
    match incoming-interface pppoe1
    next-hop vlan1
    default-next-hop wwan1
    mark ip dscp 7
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#
```

```bash
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#no default-next-hop
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#no next-hop
```

The following example shows the route-map ‘1’ settings after the ‘no’ commands are executed:

```bash
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#show context route-map 1
    match incoming-interface pppoe1
    mark ip dscp 7
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#
```
24.1.5 *use*

Uses *Critical Resource Management* (CRM) to monitor link status

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
use critical-resource-monitoring
```

**Parameters**

- `use critical-resource-monitoring`

**Examples**

```
rfs7000-37FABE(config-routing-policy-testpolicy)#use critical-resource-monitoring
rfs7000-37FABE(config-routing-policy-testpolicy)#
```

**Related Commands**

- `no` Disables CRM link status monitoring
24.1.6 no

Negates a command or sets its defaults

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [apply-to-local-packets|logging|route-map|use]

Parameters

- no <PARAMETERS>

Usage Guidelines

The no command negates any command associated with it. Wherever required, use the same parameters associated with the command getting negated.

Examples

The following example shows the routing policy ‘testpolicy’ settings before the ‘no’ commands are executed:

```
rfs7000-37FABE(config-routing-policy-testpolicy)#show context
routing-policy testpolicy
  logging
    route-map 1
      match incoming-interface pppoe1
      default-next-hop wwan1  mark ip dscp 7
rfs7000-37FABE(config-routing-policy-testpolicy)#
```

```
rfs7000-37FABE(config-routing-policy-testpolicy)#no logging
rfs7000-37FABE(config-routing-policy-testpolicy)#no route-map 1
rfs7000-37FABE(config-routing-policy-testpolicy)#no apply-to-local-packets
```

The following example shows the routing policy ‘testpolicy’ settings after the ‘no’ commands are executed:

```
rfs7000-37FABE(config-routing-policy-testpolicy)#show context
routing-policy testpolicy
  no apply-to-local-packets
rfs7000-37FABE(config-routing-policy-testpolicy)#
```
This chapter summarizes the *accounting, authentication, and authorization (AAA)* Terminal Access Control Access-Control System (TACACS) policy commands in the CLI command structure.

TACACS is a network security application that provides additional network security by providing a centralized authentication, authorization, and accounting platform. TACACS implementation requires configuration of the TACACS authentication server and database.

Use the (config) instance to configure AAA-TACACS policy commands. To navigate to the config-aaa-tacacs-policy instance, use the following commands:

```bash
rfs7000-37FABE(config)#aaa-tacacs-policy <POLICY-NAME>
```

**AAA TACACS Policy Mode commands:**

- **accounting** Configure accounting parameters
- **authentication** Configure authentication parameters
- **authorization** Configure authorization parameters
- **no** Negate a command or set its defaults
- **clrscr** Clears the display screen
- **commit** Commit all changes made in this session
- **do** Run commands from Exec mode
- **end** End current mode and change to EXEC mode
- **exit** End current mode and down to previous mode
- **help** Description of the interactive help system
- **revert** Revert changes
- **service** Service Commands
- **show** Show running system information
- **write** Write running configuration to memory or terminal

```
rfs7000-37FABE(config-aaa-tacacs-policy-test)#
```

---

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
25.1 aaa-tacacs-policy

AAA-TACACS-POLICY
The following table summarizes AAA-TACACS policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>accounting</td>
<td>Configures TACACS accounting parameters</td>
<td>page 25-3</td>
</tr>
<tr>
<td>authentication</td>
<td>Configures TACACS authentication parameters</td>
<td>page 25-6</td>
</tr>
<tr>
<td>authorization</td>
<td>Configures TACACS authorization parameters</td>
<td>page 25-9</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 25-12</td>
</tr>
</tbody>
</table>

NOTE: For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
25.1.1 accounting

- aaa-tacacs-policy

Configures the server type and interval at which interim accounting updates are sent to the server. Up to 2 accounting servers can be configured.

This feature tracks user activities on the network, and provides information such as, resources used and usage time. This information can be used for audit and billing purposes.

TACACS accounting tracks user activity and is useful for security audit purposes.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

accounting [access-method|auth-fail|commands|server|session]

accounting access-method [all|console|ssh|telnet] {console|ssh|telnet}

accounting [auth-fail|commands|session]

accounting server [<1-2>|preference]

accounting server preference [authenticated-server-host|authenticated-server-number|authorized-server-host|authorized-server-number|none]

accounting server <1-2> [host|retry-timeout-factor <50-200>|timeout]

accounting server <1-2> host <IP/HOSTNAME> {secret 0 <SECRET>|2 <SECRET>|<SECRET>} {port <1-65535>}

accounting server <1-2> timeout <3-5> {attempts <1-3>}

Parameters

- accounting access-method [all|console|ssh|telnet] {console|ssh|telnet}

<table>
<thead>
<tr>
<th>access-method</th>
<th>Configures TACACS accounting access mode. The options are: console, SSH, Telnet, and all.</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>Configures TACACS accounting for all access modes</td>
</tr>
<tr>
<td>console</td>
<td>Configures TACACS accounting for console access only</td>
</tr>
<tr>
<td>ssh</td>
<td>Configures TACACS accounting for SSH access only</td>
</tr>
<tr>
<td>telnet</td>
<td>Configures TACACS accounting for Telnet access only</td>
</tr>
</tbody>
</table>

- accounting [auth-fail|commands|session]

<table>
<thead>
<tr>
<th>auth-fail</th>
<th>Enables accounting for authentication fail details. This option is disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>commands</td>
<td>Enables accounting of commands executed. This option is disabled by default.</td>
</tr>
<tr>
<td>session</td>
<td>Enables accounting for session start and stop details. This option is disabled by default.</td>
</tr>
</tbody>
</table>

- accounting server preference [authenticated-server-host|authenticated-server-number|authorized-server-host|authorized-server-number|none]

<p>| server             | Configures a TACACS accounting server                                                    |</p>
<table>
<thead>
<tr>
<th>preference</th>
<th>Configures the accounting server preference (specifies the method of selecting a server, from the pool, to send the request)</th>
</tr>
</thead>
<tbody>
<tr>
<td>authenticated-server-host</td>
<td>Sets the authentication server as the accounting server. This is the default setting. This parameter indicates the same server is used for authentication and accounting. The server is referred to by its hostname.</td>
</tr>
<tr>
<td>authenticated-server-number</td>
<td>Sets the authentication server as the accounting server. This parameter indicates the same server is used for authentication and accounting. The server is referred to by its index or number.</td>
</tr>
<tr>
<td>authorized-server-host</td>
<td>Sets the authorization server as the accounting server. This parameter indicates the same server is used for authorization and accounting. The server is referred to by its hostname.</td>
</tr>
<tr>
<td>authorized-server-number</td>
<td>Sets the authorized server as the accounting server. This parameter indicates the same server is used for authorization and accounting. The server is referred to by its index number.</td>
</tr>
<tr>
<td>none</td>
<td>Indicates the accounting server is independent of the authentication and authorization servers.</td>
</tr>
</tbody>
</table>

- accounting server <1-2> retry-timeout-factor <50-200>

<table>
<thead>
<tr>
<th>server &lt;1-2&gt;</th>
<th>Configures an accounting server. Up to 2 accounting servers can be configured</th>
</tr>
</thead>
</table>
| retry-timeout-factor <50-200> | Sets the scaling factor for retry timeouts  
  • <50-200> – Specify a value from 50 - 200. The default is 100.  
  A value of 100 indicates the time gap between two consecutive retries remains the same irrespective of the number of retries.  
  A value lesser than 100 indicates the time gap between two consecutive retries reduces with each successive retry.  
  A value greater than 100 indicates the time gap between two consecutive retries increases with each successive retry. |

- accounting server <1-2> host <IP/HOSTNAME> {secret [0 <SECRET> | 2 <SECRET> | <SECRET>]} {port <1-65535>}

<table>
<thead>
<tr>
<th>server &lt;1-2&gt;</th>
<th>Configures an accounting server. Up to 2 accounting servers can be configured</th>
</tr>
</thead>
<tbody>
<tr>
<td>host &lt;IP/HOSTNAME&gt;</td>
<td>Configures the accounting server's IP address or hostname</td>
</tr>
</tbody>
</table>
| secret [0 <SECRET> | 2 <SECRET> | <SECRET>] | Optional. Configures a common secret key used to authenticate with the accounting server  
  • 0 <SECRET> – Configures a clear text secret key  
  • 2 <SECRET> – Configures an encrypted secret key  
  • <SECRET> – Specify the secret key. This shared secret should not exceed 127 characters. |
| port <1-65535>             | Optional. Configures the accounting server port (the port used to connect to the accounting server)  
  • <1-65535> – Specify the TCP accounting port number from 1 - 65535. The default port is 49. |

- accounting server <1-2> timeout <3-5> {attempts <1-3>}

| server <1-2>               | Configures an accounting server. Up to 2 accounting servers can be configured |
timeout <3-5>  Configures the timeout for each request sent to the TACACS accounting server. This is the time allowed to elapse before another request is sent to the TACACS accounting server. If a response is received from the server within this time, no retry is attempted.
   • <3-5> – Specify a value from 3 - 5 seconds. The default is 3 seconds.

attempts <1-3>  Optional. Specifies the number of times a transmission request is attempted. This is the maximum number of times a request is sent to the TACACS accounting server before getting discarded.
   • <1-3> – Specify a value from 1 - 3. The default is 3.

Examples
rfs7000-37FABE(config-aaa-tacacs-policy-test)#accounting auth-fail
rfs7000-37FABE(config-aaa-tacacs-policy-test)#accounting commands
rfs7000-37FABE(config-aaa-tacacs-policy-test)#accounting server preference authorized-server-number
rfs7000-37FABE(config-aaa-tacacs-policy-test)#show context aaa-tacacs-policy test
   accounting server preference authorized-server-number
   accounting auth-fail
   accounting commands
rfs7000-37FABE(config-aaa-tacacs-policy-test)#

Related Commands

no  Resets values or disables commands
25.1.2 authentication

aaa-tacacs-policy

Configures user authentication parameters. Users are allowed or denied access to the network based on the authentication parameters set.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
authentication [access-method|directed-request|server|service]
```

```
authentication access-method [all|console|ssh|telnet|web] {console|ssh|telnet|web}
```

```
authentication directed-request
```

```
authentication server <1-2> [host|retry-timeout-factor|timeout] {port <1-65535>}
```

```
authentication server <1-2> host <IP/HOSTNAME> {secret [0 <SECRET>|2 <SECRET>|<SECRET>]}
```

```
authentication service <SERVICE-NAME> {protocol <AUTHENTICATION-PROTO-NAME>}
```

Parameters

- **access-method**
  - Configures access modes for TACACS authentication. The options are: console, SSH, Telnet, Web, and all.
  - all: Authenticates users using all access modes (console, SSH, and Telnet)
  - console: Authenticates users using console access only
  - ssh: Authenticates users using SSH access only
  - telnet: Authenticates users using Telnet access only
  - web: Authenticates users using Web interface only

- **directed-request**
  - Enables user to specify TACACS server to use with `@server`. This option is disabled by default.
  - **Note**: The specified server should be present in the configured servers list.

- **server <1-2>**
  - Configures a TACACS authentication server. Up to 2 TACACS servers can be configured
  - `<1-2>` — Specify the TACACS server index from 1 - 2.

- **host <IP/HOSTNAME>**
  - Sets the TACACS server’s IP address or hostname
| secret [0 <SECRET>| 2 <SECRET>| <SECRET>] | Configures the secret key used to authenticate with the TACACS server  
|• 0 <SECRET> – Configures a clear text secret  
|• 2 <SECRET> – Configures an encrypted secret  
|• <SECRET> – Specify the secret key. The shared key should not exceed 127 characters. |
| port <1-65535> | Optional. Specifies the port used to connect to the TACACS server  
|• <1-65535> – Specify a value for the TCP authentication port from 1 - 65535. The default port is 49. |
| server <1-2> | Configures a TACACS authentication server. Up to 2 TACACS servers can be configured  
|• <1-2> – Specify the TACACS server index from 1 - 2. |
| retry-timeout-factor <50-200> | Configures timeout scaling between two consecutive TACACS authentication retries  
|• <50-200> – Specify the scaling factor from 50 - 200. The default is 100.  
A value of 100 indicates the interval between consecutive retries remains the same irrespective of the number of retries.  
A value lesser than 100 indicates the interval between consecutive retries reduces with each successive retry.  
A value greater than 100 indicates the interval between consecutive retries increases with each successive retry. |
| service <SERVICE-NAME> | Configures the TACACS authentication service name |
| protocol <AUTHENTICATION-PROTO-NAME> | Optional. Specify the authentication protocol used with this TACACS policy.  
|**Note:** A maximum of five entries is allowed. |
Examples
rfs7000-37FABE(config-aaa-tacacs-policy-test)#authentication directed-request
rfs7000-37FABE(config-aaa-tacacs-policy-test)#show context
aaa-tacacs-policy test
  authentication directed-request
  accounting server preference authorized-server-number
  accounting auth-fail
  accounting commands
rfs7000-37FABE(config-aaa-tacacs-policy-test)#

Related Commands

| no          | Resets values or disables commands |
25.1.3 authorization

`aaa-tacacs-policy`

Configures authorization parameters

This feature allows network administrators to limit user accessibility and configure varying levels of accessibility for different users.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```plaintext
authorization [access-method|allow-privileged-commands|server]
authorization access-method [all|console|telnet|ssh] {(console|ssh|telnet)}
authorization server [<1-2>|preference]
authorization server <1-2> [host|retry-timeout-factor|timeout]
authorization server <1-2> host <IP/HOSTNAME> {secret [0 <SECRET>|2 <SECRET>|<SECRET>]} {port <1-65535>}
authorization server <1-2> retry-timeout-factor <50-200>
authorization server <1-2> timeout <3-5> {attempts <1-3>}
authorization server preference [authenticated-server-host|authenticated-server-number|none]
```

Parameters

- **access-method**
  - all
  - console
  - telnet
  - ssh

- **allow-privileged-commands**
  - Allows privileged commands execution without command authorization. This option is disabled by default.

- **server <1-2>**
  - Configures a TACACS authorization server. Up to 2 TACACS servers can be configured
  - `<1-2>` – Specify the TACACS server index from 1 - 2.

- **host <IP/HOSTNAME>**
  - Sets the TACACS server’s IP address or hostname
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>secret [0 &lt;SECRET&gt;</td>
<td>2 &lt;SECRET&gt;</td>
</tr>
<tr>
<td></td>
<td>• 0 &lt;SECRET&gt; – Configures a clear text secret</td>
</tr>
<tr>
<td></td>
<td>• 2 &lt;SECRET&gt; – Configures an encrypted secret</td>
</tr>
<tr>
<td></td>
<td>• &lt;SECRET&gt; – Specify the secret key. The shared key should not exceed 127 characters.</td>
</tr>
<tr>
<td>port &lt;1-65535&gt;</td>
<td>Optional. Specifies the port used to connect to the TACACS server.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-65535&gt; – Specify a value for the TCP authorization port from 1 - 65535. The default port is 49.</td>
</tr>
<tr>
<td>retry-timeout-factor &lt;50-200&gt;</td>
<td>Configures the scaling of timeouts between consecutive TACACS authorization retries.</td>
</tr>
<tr>
<td></td>
<td>• &lt;50-200&gt; – Specify the scaling factor from 50 - 200. The default is 100.</td>
</tr>
<tr>
<td></td>
<td>A value of 100 indicates the interval between consecutive retries remains the same irrespective of the number of retries.</td>
</tr>
<tr>
<td></td>
<td>A value lesser than 100 indicates the interval between consecutive retries reduces with each successive retry.</td>
</tr>
<tr>
<td></td>
<td>A value greater than 100 indicates the interval between consecutive retries increases with each successive retry.</td>
</tr>
<tr>
<td>server &lt;1-2&gt;</td>
<td>Configures a TACACS authorization server. Up to 2 TACACS servers can be configured.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-2&gt; – Specify the TACACS server index from 1 - 2.</td>
</tr>
<tr>
<td>preference</td>
<td>Configures the authorization server preference.</td>
</tr>
<tr>
<td>authenticated-server-host</td>
<td>Sets the authentication server as the authorization server.</td>
</tr>
<tr>
<td></td>
<td>This parameter indicates the same server is used for authentication and authorization. The server is referred to by its hostname.</td>
</tr>
<tr>
<td>authenticated-server-number</td>
<td>Sets the authentication server as the authorization server.</td>
</tr>
<tr>
<td></td>
<td>This parameter indicates the same server is used for authentication and authorization. The server is referred to by its index or number.</td>
</tr>
<tr>
<td>none</td>
<td>Indicates the authorization server is independent of the authentication server.</td>
</tr>
</tbody>
</table>
Examples

rfs7000-37FABE(config-aaa-tacacs-policy-test)#authorization allow-privileged-commands

rfs7000-37FABE(config-aaa-tacacs-policy-test)#show context aaa-tacacs-policy test
authentication directed-request
accounting server preference authorized-server-number
authorization allow-privileged-commands
accounting auth-fail
accounting commands

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets values or disables commands</td>
</tr>
</tbody>
</table>
25.1.4 no

Negates a AAA TACACS policy command or sets its default

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
	no [accounting|authentication|authorization]

Parameters

- no <PARAMETERS>

Examples

The following example shows the AAA-TACACS policy ‘test’ settings before the ‘no’ commands are executed:

```bash
rfs7000-37FABE(config-aaa-tacacs-policy-test)#show context
aaa-tacacs-policy test
authentication directed-request
accounting server preference authorized-server-number
authorization allow-privileged-commands
accounting auth-fail
accounting commands
rfs7000-37FABE(config-aaa-tacacs-policy-test)#
```

```bash
rfs7000-37FABE(config-aaa-tacacs-policy-test)#no authentication directed-request
rfs7000-37FABE(config-aaa-tacacs-policy-test)#no accounting auth-fail
rfs7000-37FABE(config-aaa-tacacs-policy-test)#no authorization allow-privileged-commands
```

The following example shows the AAA-TACACS policy ‘test’ settings after the ‘no’ commands are executed:

```bash
rfs7000-37FABE(config-aaa-tacacs-policy-test)#show context
aaa-tacacs-policy test
accounting server preference authorized-server-number
accounting commands
rfs7000-37FABE(config-aaa-tacacs-policy-test)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>accounting</td>
<td>Configures TACACS accounting parameters</td>
</tr>
<tr>
<td>authentication</td>
<td>Configures TACACS authentication parameters</td>
</tr>
<tr>
<td>authorization</td>
<td>Configures TACACS authorization parameters</td>
</tr>
</tbody>
</table>
This chapter summarizes the Meshpoint commands in the CLI command structure. Meshpoints are detector radios that monitor their coverage areas for potential failed peers or coverage area holes requiring transmission adjustments for coverage compensation.

This chapter is organized as follows:

- meshpoint-config-instance
- meshpoint-qos-policy-config-instance
- meshpoint-device-config-instance

NOTE: The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
26.1 meshpoint-config-instance

MeshConnex (MCX) is a mesh networking technology that is comparable to the 802.11s mesh networking specification. MCX meshing uses a hybrid proactive/on-demand path selection protocol, similar to Ad hoc On Demand Distance Vector (AODV) routing protocols. This allows it to form efficient paths using multiple attachment points to a distribution WAN, or form purely ad-hoc peer-to-peer mesh networks in the absence of a WAN. Each device in the MCX mesh proactively manages its own path to the distribution WAN, but can also form peer-to-peer paths on demand to improve forwarding efficiency.

MCX is not compatible with MiNT Based meshing, though the two technologies can be enabled simultaneously in certain circumstances.

MCX is designed for large-scale, high-mobility outdoor mesh deployments. MCX continually gathers data from beacons and transmission attempts to estimate the efficiency and throughput of each MP-to-MP link. MCX uses this data to dynamically form and continually maintain paths for forwarding network frames.

In MCX systems, a meshpoint (MP) is a virtual mesh networking instance on a device, similar to a WLAN AP. On each device, up to 4 MPs can be created and 2 can be created per radio. MPs can be configured to use one or both radios in the device. If the MP is configured to use both radios, the path selection protocols will continually select the best radio to reach each destination. Each MP participates in a single Mesh Network, defined by the MeshID. The MeshID is typically a descriptive network name, similar to the SSID of a WLAN. All MPs configured to use the same MeshID attempt to form a mesh and interoperate. The MeshID allows overlapping mesh networks to discriminate and disregard MPs belonging to different networks.

Use the (config) instance to configure a meshpoint. To navigate to the meshpoint configuration instance, use the following command:

```
<DEVICE>(config)#meshpoint <MESHPOINT-NAME>
```

```
rfs7000-37FABE(config)#meshpoint test
rfs7000-37FABE(config-meshpoint-test)#?
```

Mesh Point Mode commands:
- allowed-vlans Set the allowed VLANs
- beacon-format The beacon format of this meshpoint
- control-vlan VLAN for meshpoint control traffic
- data-rates Specify the 802.11 rates to be supported on this meshpoint
- description Configure a description of the usage of this meshpoint
- force Force suboptimal paths
- meshid Configure the Service Set Identifier for this meshpoint
- neighbor Configure neighbor specific parameters
- no Negate a command or set its defaults
- root Set this meshpoint as root
- security-mode The security mode of this meshpoint
- shutdown Shutdown this meshpoint
- use Set setting to use
- wpa2 Modify ccmp wpa2 related parameters
- clrscr Clears the display screen
- commit Commit all changes made in this session
- do Run commands from Exec mode
- end End current mode and change to EXEC mode
- exit End current mode and down to previous mode
- help Description of the interactive help system
- revert Revert changes
- service Service Commands
- show Show running system information
- write Write running configuration to memory or terminal

```
rfs7000-37FABE(config-meshpoint-test)#
```
The following table summarizes meshpoint configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>allowed-vlans</code></td>
<td>Configures VLANs allowed on the meshpoint</td>
<td>page 26-4</td>
</tr>
<tr>
<td><code>beacon-format</code></td>
<td>Configures the beacon format for the meshpoint AP</td>
<td>page 26-5</td>
</tr>
<tr>
<td><code>control-vlan</code></td>
<td>Configures the VLAN where meshpoint control traffic traverses</td>
<td>page 26-6</td>
</tr>
<tr>
<td><code>data-rates</code></td>
<td>Configures the data rates supported per frequency band</td>
<td>page 26-7</td>
</tr>
<tr>
<td><code>description</code></td>
<td>Configures a human friendly description for this meshpoint</td>
<td>page 26-11</td>
</tr>
<tr>
<td><code>force</code></td>
<td>Forces formation of sub-optimal paths through the meshpoint's root node</td>
<td>page 26-12</td>
</tr>
<tr>
<td><code>meshid</code></td>
<td>Configures a unique ID for this meshpoint</td>
<td>page 26-13</td>
</tr>
<tr>
<td><code>neighbor</code></td>
<td>Configures the neighbor inactivity time out for this meshpoint</td>
<td>page 26-14</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negates a command or reverts settings to their default</td>
<td>page 26-15</td>
</tr>
<tr>
<td><code>root</code></td>
<td>Configures a meshpoint as the root meshpoint</td>
<td>page 26-17</td>
</tr>
<tr>
<td><code>security-mode</code></td>
<td>Configures the security mode on the meshpoint.</td>
<td>page 26-19</td>
</tr>
<tr>
<td><code>service</code></td>
<td>Allows only 802.11n capable neighbors to create a mesh connection</td>
<td>page 26-21</td>
</tr>
<tr>
<td><code>shutdown</code></td>
<td>Shuts down the meshpoint</td>
<td>page 26-22</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Configures a QoS policy for use with this meshpoint</td>
<td>page 26-23</td>
</tr>
<tr>
<td><code>wpa2</code></td>
<td>Configures WPA2 encryption settings</td>
<td>page 26-24</td>
</tr>
</tbody>
</table>

NOTE: For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
26.1.1 allowed-vlans

meshpoint-config-instance

Defines VLANs allowed on the mesh network. A VLAN must be added to the allowed VLANs list for data to be allowed across the mesh network. Use this command to remove VLANs from the list of allowed VLANs.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
allowed-vlans [<VLAN-ID>|add <VLAN-ID>|remove <VLAN-ID>]

Parameters
- allowed-vlans [<VLAN-ID>|add <VLAN-ID>|remove <VLAN-ID>]

<table>
<thead>
<tr>
<th>allowed-vlans</th>
<th>Defines VLANs allowed access on the mesh network</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;VLAN-ID&gt;</td>
<td>The VLAN ID or the range of IDs to be managed. A single VLAN or multiple VLANs can be added to the list of allowed VLANs. When adding multiple VLANs, specify the range (for example, 10-20, 25, 30-35). Use this command to create a VLAN list on a new meshpoint.</td>
</tr>
</tbody>
</table>

add <VLAN-ID>  Adds a single VLAN or a range of VLANs to the list of allowed VLANs. To specify a range of VLANs, specify the first and last VLAN ID in the range separated by a hyphen (for example, 1-10).
- <VLAN-ID> – Specify the VLAN ID or the range of IDs to add.

remove <VLAN-ID>  Removes a single VLAN or a range of VLANs from the list of allowed VLANs
- <VLAN-ID> – Specify the VLAN ID or the range of IDs to remove.

Examples
rfs7000-37FABE(config-meshpoint-test)#allowed-vlans 1
rfs7000-37FABE(config-meshpoint-test)#allowed-vlans add 10-23
rfs7000-37FABE(config-meshpoint-test)#allowed-vlans remove 17
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
meshid test
beacon-format mesh-point
control-vlan 1
allowed-vlans 1,10-16,18-23
security-mode none
no root
rfs7000-37FABE(config-meshpoint-test)#

Related Commands
no  Clears the list of VLANs allowed access to the mesh network
26.1.2 `beacon-format`

Configures the beacon transmission format for this meshpoint. Beacons are transmitted periodically to advertise that a wireless network is available. It contains all the required information for a device to connect to the network. The beacon format advertises how a mesh capable AP71XX acts. APs can act either as an access point or a meshpoint.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`beacon-format [access-point|mesh-point]`

**Parameters**

- `beacon-format [access-point|mesh-point]`

<table>
<thead>
<tr>
<th>beacon-format</th>
<th>Configures how a mesh capable AP71XX acts in a mesh network</th>
</tr>
</thead>
<tbody>
<tr>
<td>access-point</td>
<td>Uses access point style beacons</td>
</tr>
<tr>
<td>mesh-point</td>
<td>Uses meshpoint style beacons (this is the default setting)</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-meshpoint-test)#beacon-format mesh-point

rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
meshid test
beacon-format mesh-point
control-vlan 1
allowed-vlans 1,10-16,18-23
security-mode none
no root
rfs7000-37FABE(config-meshpoint-test)#
```

**Related Commands**

- `no` Resets the beacon format for this meshpoint to its default (mesh-point)
26.3 control-vlan

meshpoint-config-instance

Configures a VLAN as the dedicated control VLAN

Mesh management traffic can be sent over a dedicated VLAN. This dedicated VLAN is known as a control VLAN, and should be configured in the backhaul port of all the access points configured as meshpoint roots. Once configured, the control VLAN enables communication between meshpoint’s root APs.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
control-vlan <1-4094>

Parameters
- control-vlan <1-4094>

<table>
<thead>
<tr>
<th>control-vlan &lt;1-4094&gt;</th>
<th>Configures a VLAN as a dedicated carrier of mesh management traffic</th>
</tr>
</thead>
</table>

Note:
- If VLAN 1 is configured as the control VLAN, ensure that the VLAN is configured in the wired port of all access points belonging to same meshpoint.
- Control VLAN need not necessarily be added in the allowed VLAN list.

Examples
rfs7000-37FABE(config-meshpoint-test)#control-vlan 1
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
meshid test
beacon-format mesh-point
control-vlan 1
allowed-vlans 1,10-16,18-23
security-mode none
no root
rfs7000-37FABE(config-meshpoint-test)#

Related Commands
no
- Resets the control VLAN for this meshpoint to its default of 1
### 26.1.4 data-rates

**meshpoint-config-instance**

Configures individual data rates for the 2.4 GHz and 5.0 GHz frequency bands

---

**NOTE:** Ensure that the basic data rates configured on a meshpoint's root and non-root access points is the same.

---

**Supported in the following platforms:**

- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
data-rates [2.4GHz|5GHz]

data-rates 2.4GHz [b-only|bg|bgn|default|g-only|gn]

data-rates 2.4GHz custom (1|11|12|18|2|24|36|48|5.5|54|69|basic-1|basic-11|
  basic-12|basic-18|basic-24|basic-36|basic-48|basic-5.5|basic-54|basic-6|basic-9|mcs0-15|mcs0-7|mcs8-15|basic-mcs0-7)

data-rates 5GHz [a-only|an|default]

data-rates 5GHz custom (12|18|24|36|48|54|6|9|basic-1|basic-11|basic-12|basic-18|
  basic-2|basic-24|basic-36|basic-48|basic-5.5|basic-54|basic-6|basic-9|mcs0-15|
  mcs0-7|mcs8-15|basic-mcs0-7)
```

**Parameters**

- **data-rates 2.4GHz [b-only|bg|bgn|default|g-only|gn]**

<table>
<thead>
<tr>
<th>data-rates 2.4GHz</th>
<th>Configures preset data rates for the 2.4 GHz frequency.</th>
</tr>
</thead>
<tbody>
<tr>
<td>b-only</td>
<td>Configures data rate for the meshpoint using 802.11b only rates.</td>
</tr>
<tr>
<td>bg</td>
<td>Configures data rate for the meshpoint using 802.11b and 802.11g rates.</td>
</tr>
<tr>
<td>default</td>
<td>Configures data rate for the meshpoint at a pre-configured default rate for this frequency.</td>
</tr>
<tr>
<td>g-only</td>
<td>Configures data rate for the meshpoint using 802.11g only rates.</td>
</tr>
<tr>
<td>gn</td>
<td>Configures data rate for the meshpoint using 802.11g and 802.11n rates.</td>
</tr>
</tbody>
</table>

- **data-rates 2.4GHz custom (1|11|12|18|2|24|36|48|5.5|54|69|basic-1|basic-11|basic-12|basic-18|basic-2|basic-24|basic-36|basic-48|basic-5.5|basic-54|basic-6|basic-9|mcs0-15|mcs0-7|mcs8-15|basic-mcs0-7)**

**data-rates 2.4GHz**

Configures the preset data rates for the 2.4 GHz frequency

Define both minimum *Basic* and optimal *Supported* rates as required for the 802.11b rates, 802.11g rates and 802.11n rates supported by the 2.4 GHz band. These are the rates wireless client traffic is supported within this mesh point. If supporting 802.11n, select a supported MCS index. Set a **Modulation and Coding Scheme** (MCS) in respect to the radio's channel width and guard interval. A MCS defines (based on RF channel conditions) an optimal combination of 8 data rates, bonded channels, multiple spatial streams, different guard intervals and modulation types.

Contd..
Meshpoints can communicate as long as they support the same basic MCS (as well as non-802.11n basic rates). The selected rates apply to associated client traffic within this mesh point only.

| data-rates 5GHz [a-only|an|default] |
|-------------------------------------|
| **custom**                         |
| (1|11|12|18|2|24|36|48|5.5|54|6|9|basic-1|basic-11|basic-12|basic-18|basic-2|basic-24|basic-36|basic-48|basic-5.5|basic-54|basic-6|basic-9|mcs0-15|mcs0-7|mcs8-15|basic-mcs0-7) |
| Configures custom rates |
| • 1 – Configures the available rate at 1 Mbps |
| • 2 – Configures the available rate at 2 Mbps |
| • 5.5 – Configures the available rate at 5.5 Mbps |
| • 6 – Configures the available rate at 6 Mbps |
| • 9 – Configures the available rate at 9 Mbps |
| • 11 – Configures the available rate at 11 Mbps |
| • 12 – Configures the available rate at 12 Mbps |
| • 18 – Configures the available rate at 18 Mbps |
| • 24 – Configures the available rate at 24 Mbps |
| • 36 – Configures the available rate at 36 Mbps |
| • 48 – Configures the available rate at 48 Mbps |
| • 54 – Configures the available rate at 54 Mbps |
| • basic-1 – Configures the available rate at a basic rate of 1 Mbps |
| • basic-2 – Configures the available rate at a basic rate of 2 Mbps |
| • basic-5.5 – Configures the available rate at a basic rate of 5.5 Mbps |
| • basic-6 – Configures the available rate at a basic rate of 6 Mbps |
| • basic-9 – Configures the available rate at a basic rate of 9 Mbps |
| • basic-11 – Configures the available rate at a basic rate of 11 Mbps |
| • basic-12 – Configures the available rate at a basic rate of 12 Mbps |
| • basic-18 – Configures the available rate at a basic rate of 18 Mbps |
| • basic-24 – Configures the available rate at a basic rate of 24 Mbps |
| • basic-36 – Configures the available rate at a basic rate of 36 Mbps |
| • basic-48 – Configures the available rate at a basic rate of 48 Mbps |
| • basic-54 – Configures the available rate at a basic rate of 54 Mbps |
| • basic-mcs0-7 – Configures the MCS index range of 0 - 7 for basic rate |
| • mcs0-7 – Configures the MCS index range of 0-7 as the data rate |
| • mcs0-15 – Configures the MCS index range of 0-15 as the data rate |

**Note:** Multiple choices can be made from the above list of rates.
| **data-rates 5GHz custom** (12|18|24|36|48|54|6|9|basic-1|basic-11|basic-12|basic-18|basic-2|basic-24|basic-36|basic-48|basic-5.5|basic-54|basic-6|basic-9|mcs0-15|mcs0-7|mcs8-15|basic-mcs0-7) |
|---|
| **data-rates 5GHz** | Configures the preset data rates for the 5.0 GHz frequency
| | Define both minimum Basic and optimal Supported rates as required for 802.11a and 802.11n rates supported by the 5.0 GHz radio band. These are the rates wireless client traffic is supported within this mesh point.
| | If supporting 802.11n, select a supported MCS index. Set a MCS in respect to the radio's channel width and guard interval. A MCS defines (based on RF channel conditions) an optimal combination of 8 data rates, bonded channels, multiple spatial streams, different guard intervals and modulation types. Mesh points can communicate as long as they support the same basic MCS (as well as non-802.11n basic rates). The selected rates apply to associated client traffic within this mesh point only.
| **custom (12|18|24|36|48|54|6|9|basic-1|basic-11|basic-12|basic-18|basic-2|basic-24|basic-36|basic-48|basic-5.5|basic-54|basic-6|basic-9|mcs0-15|mcs0-7|mcs8-15|basic-mcs0-7)** | Configures custom rates
|  | • 6 – Configures the available rate at 6 Mbps
|  | • 9 – Configures the available rate at 9 Mbps
|  | • 12 – Configures the available rate at 12 Mbps
|  | • 18 – Configures the available rate at 18 Mbps
|  | • 24 – Configures the available rate at 24 Mbps
|  | • 36 – Configures the available rate at 36 Mbps
|  | • 48 – Configures the available rate at 48 Mbps
|  | • 54 – Configures the available rate at 54 Mbps
|  | • basic-1 – Configures the available rate at a basic rate of 1 Mbps
|  | • basic-2 – Configures the available rate at a basic rate of 2 Mbps
|  | • basic-5.5 – Configures the available rate at a basic rate of 5.5 Mbps
|  | • basic-6 – Configures the available rate at a basic rate of 6 Mbps
|  | • basic-9 – Configures the available rate at a basic rate of 9 Mbps
|  | • basic-11 – Configures the available rate at a basic rate of 11 Mbps
|  | • basic-12 – Configures the available rate at a basic rate of 12 Mbps
|  | • basic-18 – Configures the available rate at a basic rate of 18 Mbps
|  | • basic-24 – Configures the available rate at a basic rate of 24 Mbps
|  | • basic-36 – Configures the available rate at a basic rate of 36 Mbps
|  | • basic-48 – Configures the available rate at a basic rate of 48 Mbps
|  | • basic-54 – Configures the available rate at a basic rate of 54 Mbps
|  | • basic-mcs0-7 – Configures the MCS index range of 0-7 for basic rate
|  | • mcs0-7 – Configures the MCS index range of 0-7 as the data rate
|  | • mcs0-15 – Configures the MCS index range of 0-15 as the data rate
|  | • mcs8-15 – Configures the MCS index range of 8-15 as the data rate

**Note:** Multiple choices can be made from the above list of rates.
Examples

rfs7000-37FABE(config-meshpoint-test)#data-rates 2.4GHz bgn

rfs7000-37FABE(config-meshpoint-test)#data-rates 5GHz an

rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
meshid test
beacon-format mesh-point
control-vlan 1
allowed-vlans 1,10-16,18-23
data-rates 2.4GHz bgn
data-rates 5GHz an
security-mode none
no root
rfs7000-37FABE(config-meshpoint-test)#

Related Commands

| no          | Resets data rates for each frequency band for this meshpoint |
### 26.1.5 description

> **meshpoint-config-instance**

Configures a brief description for this meshpoint. Use this command to describe this meshpoint and its features.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

description <DESCRIPTION>

**Parameters**

- description <DESCRIPTION>

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
<th>examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Configures a description for this meshpoint</td>
<td>rfs7000-37FABE(config-meshpoint-test)#description &quot;This is an example of a meshpoint description&quot;</td>
</tr>
<tr>
<td>&lt;DESCRIPTION&gt;</td>
<td>The text describing this meshpoint</td>
<td>rfs7000-37FABE(config-meshpoint-test)#show context meshpoint test description &quot;This is an example of a meshpoint description&quot;</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-meshpoint-test)#description "This is an example of a meshpoint description"
```

```
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
    description "This is an example of a meshpoint description"
    meshid test
    beacon-format mesh-point
    control-vlan 1
    allowed-vlans 1,10-16,18-23
    data-rates 2.4GHz bgn
    data-rates 5GHz an
    security-mode none
    no root
```

**Related Commands**

- no
  - Removes the human friendly description provided for this meshpoint

```
rfs7000-37FABE(config-meshpoint-test)#
```
26.1.6 force

meshpoint-config-instance

Forces formation of sub-optimal paths through the meshpoint’s root node. As per legacy behavior, non-root devices under the same root, communicated by forming direct paths through the network. This option allows non-root devices, within the meshpoint, to communicate by forming paths through the root node.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
force peer-paths-through-root

Parameters
- force peer-paths-through-root

Examples
nx9500-6C8809(config-meshpoint-test)#force peer-paths-through-root
nx9500-6C8809(config-meshpoint-test)#show context
meshpoint test
beacon-format mesh-point
control-vlan 1
security-mode none
no root
force peer-paths-through-root
nx9500-6C8809(config-meshpoint-test)#

Related Commands
no
Disables formation of sub-optimal paths through the meshpoint’s root node
26.1.7 meshid

meshpoint-config-instance

Configures a unique Service Set Identifier (SSID) for this meshpoint. This ID is used to uniquely identify this meshpoint.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
meshid <MESH-SSID>

Parameters
- meshid <MESH-SSID>

<table>
<thead>
<tr>
<th>meshid</th>
<th>Configures a unique SSID for the meshpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MESH-SSID&gt;</td>
<td>The unique SSID configured for this meshpoint</td>
</tr>
</tbody>
</table>

Note: The mesh SSID is case sensitive and should not exceed 32 characters.

Examples
rfs7000-37FABE(config-meshpoint-test)#meshid TestingMeshPoint
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
description "This is an example of a meshpoint description"

meshid TestingMeshPoint
beacon-format mesh-point
control-vlan 1
allowed-vlans 1,10-16,18-23
data-rates 2.4GHz bgn
data-rates 5GHz an
security-mode none
no root
rfs7000-37FABE(config-meshpoint-test)#

Related Commands
- no | Removes the SSID configured for this meshpoint
This command configures the inactivity timeout value for neighboring devices. If a frame is not received from the neighbor device for the configured time, then client resources are removed.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
neighbor inactivity-timeout <60-86400>

Parameters
- neighbor inactivity-timeout <60-86400>

Examples
rfs7000-37FABE(config-meshpoint-test)#neighbor inactivity-timeout 300
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
description "This is an example of a meshpoint description"
meshid TestingMeshPoint
beacon-format mesh-point
control-vlan 1
allowed-vlans 1,10-16,18-23
neighbor inactivity-timeout 300
data-rates 2.4GHz bgn
data-rates 5GHz an
security-mode none
no root
rfs7000-37FABE(config-meshpoint-test)#

Related Commands
- **no** Removes the configured neighbor inactivity timeout value for this meshpoint
26.1.9 no

Negates meshpoint commands or resets their values to default

Supported in the following platforms:

- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
no [allowed-vlans|beacon-format|control-vlan|description|force|meshid|root|
    security-mode|shutdown]
```

```
no data-rates [2.4GHz|5GHz]
no force peer-paths-through-root
no neighbor inactivity-timeout
no use [aaa-policy|meshpoint-qos-policy]
```

```
no wpa2 [eap|key-rotation|psk]
no wpa2 eap [auth-type|identity|peap-mschapv2|tls trustpoint]
no wpa2 key-rotation [broadcast|unicast]
no wpa2 psk
```

```
no service allow-ht-only
```

Parameters

- no <PARAMETERS>

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes or reverts this meshpoint settings to default based on the parameters passed</th>
</tr>
</thead>
</table>

Examples

```
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
    description "This is an example of a meshpoint description"
    meshid TestingMeshPoint
    shutdown
    beacon-format mesh-point
    control-vlan 1
    allowed-vlans 1,10-16,18-23
    neighbor inactivity-timeout 300
    data-rates 2.4GHz bgn
    data-rates 5GHz an
    security-mode psk
    wpa2 psk 0 Test Company
    wpa2 key-rotation unicast 1200
    wpa2 key-rotation broadcast 600
    root
rfs7000-37FABE(config-meshpoint-test)#
```

```
rfs7000-37FABE(config-meshpoint-test)#no allowed-vlans
rfs7000-37FABE(config-meshpoint-test)#no beacon-format
rfs7000-37FABE(config-meshpoint-test)#no control-vlan
rfs7000-37FABE(config-meshpoint-test)#no description
rfs7000-37FABE(config-meshpoint-test)#no meshid
rfs7000-37FABE(config-meshpoint-test)#no root
rfs7000-37FABE(config-meshpoint-test)#no security-mode
```
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
  beacon-format mesh-point
  control-vlan 1
  neighbor inactivity-timeout 300
  data-rates 2.4GHz bgn
  data-rates 5GHz an
  security-mode none
  wpa2 psk 0 Test Company
  wpa2 key-rotation unicast 1200
  wpa2 key-rotation broadcast 600
  no root

rfs7000-37FABE(config-meshpoint-test)#no data-rates 2.4GHz
rfs7000-37FABE(config-meshpoint-test)#no data-rates 5GHz
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
  beacon-format mesh-point
  control-vlan 1
  neighbor inactivity-timeout 300
  security-mode none
  wpa2 psk 0 Test Company
  wpa2 key-rotation unicast 1200
  wpa2 key-rotation broadcast 600
  no root

nx9500-6C8809(config-meshpoint-test)#show context
meshpoint test
  meshid test
  beacon-format mesh-point
  control-vlan 1
  security-mode none
  no root
  force peer-paths-through-root
nx9500-6C8809(config-meshpoint-test)#

nx9500-6C8809(config-meshpoint-test)#no force peer-paths-through-root
nx9500-6C8809(config-meshpoint-test)#show context
meshpoint test
  meshid test
  beacon-format mesh-point
  control-vlan 1
  security-mode none
  no root
nx9500-6C8809(config-meshpoint-test)#
26.1.10 root

meshpoint-config-instance

Configures this meshpoint as the root meshpoint. Root meshpoints are generally tied to an Ethernet backhaul for wired connectivity. By default this option is disabled.

Supported in the following platforms:

- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

root

Parameters

None

Examples

There are two ways of configuring root access points within a meshpoint.

1. First method:

   - Configure two meshpoints, having the same meshid, one with the root option enabled and the other configured as no root.
   - Apply the root meshpoint to the root access point and the no-root meshpoint to the non-root access points.

The following examples show the configuration of a meshpoint for the root access point:

```
rfs7000-37FABE(config)#meshpoint root
rfs7000-37FABE(config)#meshpoint root
rfs7000-37FABE(config-meshpoint-root)#meshid test
rfs7000-37FABE(config-meshpoint-root)#root
rfs7000-37FABE(config-meshpoint-root)#security-mode eap
rfs7000-37FABE(config-meshpoint-root)#commit
```

```
rfs7000-37FABE(config-meshpoint-root)#show context
meshpoint test-root
   meshid test
   beacon-format mesh-point
   control-vlan 1
   security-mode eap
   root
rfs7000-37FABE(config-meshpoint-root)#
```

The following examples show the configuration of a meshpoint for non-root access points:

```
rfs7000-37FABE(config)#meshpoint no-root
rfs7000-37FABE(config)#meshpoint no-root
rfs7000-37FABE(config-meshpoint-no-root)#meshid test
rfs7000-37FABE(config-meshpoint-no-root)#security-mode eap
```

```
rfs7000-37FABE(config-meshpoint-no-root)#show context
meshpoint no-root
   meshid test
   beacon-format mesh-point
   control-vlan 1
   security-mode eap
   no root
rfs7000-37FABE(config-meshpoint-no-root)#
```
2. Second method:
   - Configure a no-root meshpoint and apply to all access points in the meshpoint.
   - Log into the meshpoint-device > no-root configuration mode of the root access point and enable root.

```
rfs7000-37FABE(config-meshpoint-no-root)#show context
meshpoint no-root
meshid test
beacon-format mesh-point
control-vlan 1
security-mode eap
no root
rfs7000-37FABE(config-meshpoint-no-root)#
rfs7000-37FABE(config)#ap81xx B4-C7-99-71-17-28
rfs7000-37FABE(config-device-B4-C7-99-71-17-28)#meshpoint-device no-root
rfs7000-37FABE(config-device-B4-C7-99-71-17-28-meshpoint-no-root)#
rfs7000-37FABE(config-device-B4-C7-99-71-17-28-meshpoint-no-root)#show context
meshpoint no-root
meshid test
beacon-format mesh-point
control-vlan 1
security-mode eap
no root
rfs7000-37FABE(config-device-B4-C7-99-71-17-28-meshpoint-no-root)#
rfs7000-37FABE(config-device-B4-C7-99-71-17-28-meshpoint-no-root)#root
rfs7000-37FABE(config-device-B4-C7-99-71-17-28-meshpoint-no-root)#show context
meshpoint no-root
meshid test
beacon-format mesh-point
control-vlan 1
security-mode eap
root
rfs7000-37FABE(config-device-B4-C7-99-71-17-28-meshpoint-no-root)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the configuration of this meshpoint as a root meshpoint</td>
</tr>
</tbody>
</table>
26.1.11 security-mode

`meshpoint-config-instance`

Configures the security mode for this meshpoint

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`security-mode [eap|none|psk]`

**Parameters**
- `security-mode [eap|none|psk]`

<table>
<thead>
<tr>
<th>security-mode</th>
<th>Configures the security mode for this meshpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>eap</td>
<td>Uses 802.1X/EAP as the security mode. When using this option, use the <code>wpa2</code> command to specify the EAP authentication type and related parameters.</td>
</tr>
<tr>
<td>none</td>
<td>No security is configured for this meshpoint</td>
</tr>
<tr>
<td>psk</td>
<td>Uses Pre Shared Key (PSK) as the security mode. When using this option, use the <code>wpa2</code> command to enter a 64 character HEX or an 8-63 ASCII character passphrase used for authentication on the mesh point.</td>
</tr>
</tbody>
</table>

**Examples**

The following example shows `root meshpoint` configuration with PSK authentication enabled:

```
rfs7000-37FABE(config-meshpoint-test)#security-mode psk
```

```
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
description "This is an example of a meshpoint description"
meshid TestingMeshPoint
beacon-format mesh-point
control-vlan 1
allowed-vlans 1,10-16,18-23
neighbor inactivity-timeout 300
data-rates 2.4GHz bgn
data-rates 5GHz an
security-mode psk
root
rfs7000-37FABE(config-meshpoint-test)#
```

The following example shows `root meshpoint` configuration with EAP authentication enabled:

```
rfs7000-37FABE(config-meshpoint-root)#security-mode eap
```

```
rfs7000-37FABE(config-meshpoint-root)#show context
meshpoint test
meshid test
beacon-format mesh-point
control-vlan 101
allowed-vlans 101,103
use aaa-policy test
security-mode eap
root
rfs7000-37FABE(config-meshpoint-test)#
```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Resets the security configuration for this meshpoint to “none”. This indicates that no security is configured for this meshpoint.</td>
</tr>
</tbody>
</table>
## 26.1.12 service

### meshpoint-config-instance

Use this command to allow only those neighbors who are capable of 802.11n data rates to associate with this meshpoint.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
service [allow-ht-only|show cli]
```

**Parameters**

- `allow-ht-only`
- `show cli`

<table>
<thead>
<tr>
<th>service allow-ht-only</th>
<th>Allows only those neighbors who are capable of high throughput data rates (802.11n data rates) to associate with the meshpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>service show cli</td>
<td>Displays running system configuration</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-meshpoint-test)#service allow-ht-only
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
description "This is an example of a meshpoint description"
meshid TestingMeshPoint
shutdown
beacon-format mesh-point
control-vlan 1
allowed-vlans 1,10-16,18-23
neighbor inactivity-timeout 300
data-rates 2.4GHz bgn
data-rates 5GHz an
security-mode psk
wpa2 psk 0 Test Company
wpa2 key-rotation unicast 1200
wpa2 key-rotation broadcast 600
root
/service allow-ht-only
rfs7000-37FABE(config-meshpoint-test)#
```

**Related Commands**

- `no`  
  Removes the restriction that only 802.11n capable neighbor devices can associate with this meshpoint

- `service`  
  Invokes service commands to troubleshoot or debug
26.1.13 shutdown

meshpoint-config-instance

Shuts down this meshpoint. Use this command to prevent an AP from participating in a mesh network.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530,
  NX9000, NX9500, NX9510, NX9600

Syntax

shutdown

Parameters

None

Examples

rfs7000-37FABE(config-meshpoint-test)#shutdown
rfs7000-37FABE(config)

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Enables an AP as a meshpoint</td>
</tr>
</tbody>
</table>
26.1.14 use

meshpoint-config-instance

Uses a Quality of Service (QoS) policy defined specifically for meshpoints. To use this QoS policy, it must be defined. To define a meshpoint QoS policy, see meshpoint-qos-policy-config-instance.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

use [aaa-policy <AAA-POLICY-NAME>|meshpoint-qos-policy <MESHPOINT-QOS-POLICY-NAME>]

Parameters

- use [aaa-policy <AAA-POLICY-NAME>|meshpoint-qos-policy <MESHPOINT-QOS-POLICY-NAME>]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>use meshpoint-qos-policy &lt;MESHPOINT-QOS-POLICY-NAME&gt;</td>
<td>Configures this meshpoint to use a predefined meshpoint QoS policy</td>
</tr>
<tr>
<td></td>
<td>• &lt;MESHPOINT-QOS-POLICY-NAME&gt; – Specify the meshpoint QoS policy name (should be existing and configured).</td>
</tr>
<tr>
<td>use aaa-policy &lt;AAA-POLICY-NAME&gt;</td>
<td>Configures this meshpoint to use a predefined aaa-policy</td>
</tr>
<tr>
<td></td>
<td>• &lt;AAA-POLICY-NAME&gt; – Specify the aaa-policy name (should be existing and configured).</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-meshpoint-test)#use meshpoint-qos-policy test

rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
description "This is an example of a meshpoint description"
meshid TestingMeshPoint
shutdown
beacon-format mesh-point
control-vlan 1
allowed-vlans 1,10-16,18-23
neighbor inactivity-timeout 300
data-rates 2.4GHz bgn
data-rates 5GHz an
security-mode psk
root
*rfs7000-37FABE(config-meshpoint-test)##* use meshpoint-qos-policy test

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the meshpoint QoS policy associated with this meshpoint</td>
</tr>
<tr>
<td>meshpoint-qos-policy-config-instance</td>
<td>Creates and configures a meshpoint QoS policy</td>
</tr>
</tbody>
</table>
26.1.15 wpa2

**meshpoint-config-instance**

Use this command to configure the parameters of authentication mode specified using the ‘security-mode’ key word. This command also allows you to set a unicast and broadcast key rotation interval.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

- `wpa2 [eap|psk|key-rotation]`
- `wpa2 key-rotation [broadcast|unicast] <30-86400>`
- `wpa2 psk [0 <SECRET>|2 <SECRET>|<SECRET>]`
- `wpa2 eap [auth-type|identity|peap-mschapv2|tls]`
- `wpa2 eap [auth-type [peap-mschapv2|tls]|identity <WORD>]`
- `wpa2 eap peap-mschapv2 user <USER-NAME> password [0 <WORD>|2 <WORD>|<WORD>] [trustpoint <TRUSTPOINT-NAME>]`
- `wpa2 eap tls trustpoint <TRUSTPOINT-NAME>`

**Parameters**

- `wpa2 key-rotation [broadcast|unicast] <30-86400>`

<table>
<thead>
<tr>
<th><strong>wpa2 key-rotation</strong></th>
<th>Enables periodic rotation of encryption keys used for broadcast and unicast traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>broadcast</strong></td>
<td>Configures key rotation interval for broadcast and multicast traffic. This option is disabled by default. When enabled, the key indices used for encrypting/decrypting broadcast traffic is alternatively rotated based on the defined interval. Key rotation enhances the broadcast traffic security on the WLAN.</td>
</tr>
<tr>
<td><strong>unicast</strong></td>
<td>Configures key rotation interval for unicast traffic. This option is disabled by default.</td>
</tr>
<tr>
<td><strong>&lt;30-86400&gt;</strong></td>
<td>Configures key rotation interval from 30 - 86400 seconds for unicast or broadcast transmission</td>
</tr>
</tbody>
</table>

- `wpa2 psk [0 <SECRET>|2 <SECRET>|<SECRET>]`

<table>
<thead>
<tr>
<th><strong>wpa2 psk</strong></th>
<th>Configures the shared key for authentication mode PSK. If the security mode is set as ‘psk’ using the ‘security-mode’ keyword, use this command to configure the pre-shared key.</th>
</tr>
</thead>
<tbody>
<tr>
<td>**secret [0 &lt;SECRET&gt;</td>
<td>2 &lt;SECRET&gt;</td>
</tr>
<tr>
<td></td>
<td>• 0 &lt;SECRET&gt; – Configures a clear text secret</td>
</tr>
<tr>
<td></td>
<td>• 2 &lt;SECRET&gt; – Configures an encrypted secret</td>
</tr>
<tr>
<td></td>
<td>• &lt;SECRET&gt; – Specify the secret key. The pre-shared key can be in ASCII (8 to 63 characters in length) or Hexadecimal (not exceeding 64 characters in length) formats.</td>
</tr>
</tbody>
</table>
- **wpa2 eap [auth-type [peap-mschapv2|tls]|identity <WORD>]**

  **wpa2 eap**  
  Configures the 802.1X/EAP based authentication type for this meshpoint. If the security mode is set as 'eap' using the 'security-mode' keyword, use this command to specify the EAP type. The options are: peap-mschapv2 and tls.

  **auth-type [peap-mschapv2|tls]**  
  Specifies the EAP authentication type. The options are:
  - peap-mschapv2 – Configures EAP authentication type as Protected Extensible Authentication Protocol (PEAP) with default auth type MSCHAPv2. This is the default setting.
    - If using auth-type as 'peap-mschapv2', use the 'peap-mschapv2' keyword to configure user credentials and trustpoint details.
  - tls – Configures EAP authentication type as Transport Layer Security (TLS)
    - If using auth-type as 'tls', use the 'tls' keyword to configure trustpoint details.
    
    **Note:** The certificate should be issued from an Enterprise or public certificate authority to allow 802.1X clients to validate the identity of the authentication server prior to forwarding credentials.

  **identity <WORD>**  
  Configures identity to be used during phase1 authentication
  - <WORD> – Enter a string up to 256 characters in length (this should not be actual identity of user but some anonymous/bogus username)

- **wpa2 eap peap-mschapv2 user <USER-NAME> password [0 <WORD>|2 <WORD>|<WORD>] \{trustpoint <TRUSTPOINT-NAME>\}**

  **wpa2 eap peap-mschapv2**  
  Configures PEAP-related user credentials and trustpoint details

  **user <USER-NAME> password [0 <WORD>|2 <WORD>|<WORD>]**  
  Specify the user credentials used for authentication
  - user <USER-NAME> – Specify the user name.
  - password [0 <WORD>|2 <WORD>|<WORD>] – Specify the password associated with the specified user.

  **trustpoint <TRUSTPOINT-NAME>**  
  Optional. Associates a trustpoint used for installing CA certificate and verifying server certificate
  - <TRUSTPOINT-NAME> – Specify the trustpoint name (should be existing and configured).

- **wpa2 eap tls trustpoint <TRUSTPOINT-NAME>**

  **wpa2 eap tls**  
  Configures TLS client related parameters

  **trustpoint <TRUSTPOINT-NAME>**  
  Configures trustpoint details
  - trustpoint <TRUSTPOINT-NAME> – Assigns a trustpoint to be used for installing TLS client certificate, client private key, and CA certificate
  - <TRUSTPOINT-NAME> – Specify the trustpoint name (should be existing and configured)
Examples

rfs7000-37FABE(config-meshpoint-test)#wpa2 key-rotation broadcast 600
rfs7000-37FABE(config-meshpoint-test)#wpa2 key-rotation unicast 1200
rfs7000-37FABE(config-meshpoint-test)#wpa2 psk Test Company

rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
description "This is an example of a meshpoint description"
meshid TestingMeshPoint
shutdown
beacon-format mesh-point
control-vlan 1
allowed-vlans 1,10-16,18-23
neighbor inactivity-timeout 300
data-rates 2.4GHz bgn
data-rates 5GHz an
security-mode psk
wpa2 psk 0 Test Company
wpa2 key-rotation unicast 1200
wpa2 key-rotation broadcast 600
root
rfs7000-37FABE(config-meshpoint-test)#

The following example shows root meshpoint configuration with EAP authentication enabled:

rfs7000-37FABE(config-meshpoint-root)#show context
meshpoint test
meshid test
beacon-format mesh-point
control-vlan 101
allowed-vlans 101,103
use aaa-policy test
security-mode eap
root
rfs7000-37FABE(config-meshpoint-test)#

The following example shows non-root meshpoint configuration with EAP PEAP-MSCHAPv2 authentication:

rfs7000-37FABE(config-meshpoint-testNoRoot)#show context
meshpoint testNoRoot
meshid test
beacon-format mesh-point
control-vlan 101
allowed-vlans 101,103
security-mode eap
wpa2 eap peap-mschapv2 user tester123 password 0 testing1234 trustpoint mesh1
wpa2 eap identity tester123
no root
rfs7000-37FABE(config-meshpoint-testNoRoot)#

The following example shows non-root meshpoint configuration with EAP TLS authentication:

rfs7000-37FABE(config-meshpoint-testNoRoot)#show context
meshpoint testNoRoot
meshid test
beacon-format mesh-point
control-vlan 101
allowed-vlans 101,103
security-mode eap
wpa2 eap peap-mschapv2 user tester123 password 0 testing1234 trustpoint mesh1
wpa2 eap tls trustpoint mesh1
wpa2 eap identity tester123
no root
rfs7000-37FABE(config-meshpoint-testNoRoot)#

Related Commands

| no | Resets PSK configuration and key rotation duration |
26.2 meshpoint-qos-policy-config-instance

Mesh QoS provides a data traffic prioritization scheme. QoS reduces congestion from excessive traffic. If there is enough bandwidth for all users and applications (unlikely because excessive bandwidth comes at a very high cost), then applying QoS has very little value. QoS provides policy enforcement for mission-critical applications and/or users that have critical bandwidth requirements when bandwidth is shared by different users and applications.

Mesh QoS helps ensure each mesh point on the mesh network receives a fair share of the overall bandwidth, either equally or as per the proportion configured. Packets directed towards clients are classified into categories such as video, voice and data. Packets within each category are processed based on the weights defined for each mesh point.

To create a meshpoint, see meshpoint-config-instance. A meshpoint QoS policy is created from the (config) instance. To create a meshpoint QoS policy use the following command:

```
<DEVICE>(config)#meshpoint-qos-policy <POLICYNAME>
```

```
rfs7000-37FABE(config)#meshpoint-qos-policy test
rfs7000-37FABE(config-meshpoint-qos-test)#
```

Mesh Point QoS Mode commands:
- `accelerated-multicast`: Configure accelerated multicast streams address and forwarding QoS classification
- `no`: Negate a command or set its default
- `rate-limit`: Configure traffic rate-limiting parameters on a per-meshpoint/per-neighbor basis
- `clrscr`: Clears the display screen
- `commit`: Commit all changes made in this session
- `do`: Run commands from Exec mode
- `end`: End current mode and change to EXEC mode
- `exit`: End current mode and down to previous mode
- `help`: Description of the interactive help system
- `revert`: Revert changes
- `service`: Service Commands
- `show`: Show running system information
- `write`: Write running configuration to memory or terminal

```
rfs7000-37FABE(config-meshpoint-qos-test)#?
```

The following table summarizes the meshpoint-qos-policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>accelerated-multicast</td>
<td>Configures accelerated multicast parameters</td>
<td>page 26-28</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 26-30</td>
</tr>
<tr>
<td>rate-limit</td>
<td>Configures the rate limits for this QoS policy</td>
<td>page 26-31</td>
</tr>
</tbody>
</table>
26.2.1 accelerated-multicast

meshpoint-qos-policy-config-instance

Configures the accelerated multicast stream’s address and forwarding QoS classification

NOTE: For accelerated multicast feature to work, IGMP querier must be enabled.

When a user joins a multicast stream, an entry is created in the device’s (AP or wireless controller) snoop table and the entry is set to expire after a set time period. Multicast packets are forwarded to the appropriate wireless LAN or mesh until this entry is available in the snoop table.

Snoop querier keeps the snoop table current by updating entries that are set to expire. It also keeps an entry for each multicast stream till there are users registered for the stream.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
accelerated-multicast [<MULTICAST-IP>|autodetect] {classification [background|best-effort|trust|video|voice]}
```

Parameters

- `accelerated-multicast [<MULTICAST-IP>|autodetect] {classification [background|best-effort|trust|video|voice]}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>accelerated-multicast</td>
<td>Configures the accelerated multicast stream address and forwarding QoS classification</td>
</tr>
<tr>
<td>&lt;MULTICAST-IP&gt;</td>
<td>Specify a list of multicast addresses and classifications. Packets are accelerated when the destination address matches.</td>
</tr>
<tr>
<td>autodetect</td>
<td>Lets the system to automatically detect multicast streams to be accelerated. This option allows the administrator to convert multicast packets to unicast in order to provide better overall airtime utilization and performance. The system can be configured to automatically detect multicast streams and convert them to unicast, or specify which multicast streams are to be converted to unicast. When the stream is converted and being queued up for transmission, there are a number of classification mechanisms applied to the stream and the administrator can select what type of classification they would want. Classification types are trust, voice, video, best effort, and background.</td>
</tr>
<tr>
<td>classification</td>
<td>Optional. Defines the QoS classification to apply to a multicast stream. The following options are available:</td>
</tr>
<tr>
<td></td>
<td>- background</td>
</tr>
<tr>
<td></td>
<td>- best effort</td>
</tr>
<tr>
<td></td>
<td>- trust</td>
</tr>
<tr>
<td></td>
<td>- video</td>
</tr>
<tr>
<td></td>
<td>- voice</td>
</tr>
</tbody>
</table>
Examples

rfs7000-37FABE(config-meshpoint-qos-test)#accelerated-multicast 224.0.0.1
classification video

rfs7000-37FABE(config-meshpoint-qos-test)#show context
meshpoint-qos-policy test
accelerated-multicast 224.0.0.1 classification video
rfs7000-37FABE(config-meshpoint-qos-test)#

Related Commands

| no                  | Resets accelerated multicast configurations for this meshpoint QoS policy |
26.2.2 no

meshpoint-qos-policy-config-instance

Negates the commands for meshpoint QoS policy or resets their values to their default

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax
no [accelerated-multicast|rate-limit]

no accelerated-multicast [<MULTICAST-IP>|autodetect]
no rate-limit [meshpoint|neighbor] [from-air|to-air] {max-burst-size|rate}
no rate-limit [meshpoint|neighbor] [from-air|to-air] {red-threshold [background|
  best-effort|video|voice]}

Parameters
- no <PARAMETERS>

no <PARAMETERS> Removes or reverts this meshpoint QoS policy settings to default based on the parameters passed

Examples
rfs7000-37FABE(config-meshpoint-qos-test)#show context
meshpoint-qos-policy test
  rate-limit meshpoint from-air rate 80000
  rate-limit meshpoint from-air red-threshold video 80
  rate-limit meshpoint from-air red-threshold voice 70
  accelerated-multicast 224.0.0.1 classification video
rfs7000-37FABE(config-meshpoint-qos-test)#no rate-limit meshpoint from-air rate
rfs7000-37FABE(config-meshpoint-qos-test)#no rate-limit meshpoint from-air red-threshold
video 80
rfs7000-37FABE(config-meshpoint-qos-test)#no rate-limit meshpoint from-air red-threshold
voice 70
rfs7000-37FABE(config-meshpoint-qos-test)#show context
meshpoint-qos-policy test
  accelerated-multicast 224.0.0.1 classification video
rfs7000-37FABE(config-meshpoint-qos-test)#
26.2.3 rate-limit

meshpoint-qos-policy-config-instance

Configures the rate limiting of traffic on a per meshpoint or per neighbor basis. Excessive traffic can cause performance issues or bring down the network entirely. Excessive traffic, bombardments and interference are caused by numerous sources, such as network loops, faulty devices, or malicious software (such as a worm or virus) that has infected one or more branch-level devices. Rate limiting limits the maximum rate sent to or received from the wireless network (and meshpoint) per neighbor. It prevents any single user from overwhelming the wireless network. It also provides differential service for service providers. An administrator can set separate QoS rate limit configurations for data transmitted from the network and data transmitted from a mesh point's neighbor.

Before defining rate limit thresholds for meshpoint transmit and receive traffic, it is recommended that you define the normal number of ARP, broadcast, multicast, and unknown unicast packets that typically transmit and receive from each supported WMM access category. If thresholds are defined too low, normal network traffic (required by end-user devices) is dropped, resulting in intermittent outages and performance problems.

A connected neighbor can also have QoS rate limit settings defined in both the transmit and receive direction.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

rate-limit [meshpoint|neighbor]

rate-limit [meshpoint|neighbor] [from-air|to-air] {max-burst-size <2-1024>|
  rate <50-1000000>}
rate-limit [meshpoint|neighbor] [from-air|to-air] {red-threshold [background <0-100>|
  best-effort <0-100>][video <0-100>][voice <0-100>]}<2-1024>|

Parameters

- rate-limit [meshpoint|neighbor] [from-air|to-air] {max-burst-size <2-1024>|
  rate <50-1000000>}

| meshpoint | Configures rate limit parameters for all data received from any meshpoint in the mesh network. This option is disabled by default. |
| neighbor | Configures rate limit parameters for neighboring meshpoint devices. Enables rate limiting for data transmitted from the client to its associated access point radio and connected controller. This option is disabled by default. |
| from-air | Configures rate limits for traffic from the wireless neighbor to the network. |
| to-air | Configures rate limits for traffic from the network to the wireless neighbor. |
| max-burst-size <2-1024> | Optional. Configures the maximum burst size in kilobytes. |
  - `<2-1024>` — Set a value from 2 - 1024 kbytes. For a meshpoint: The smaller the burst, the less likely that the transmit packet transmission results in congestion for the meshpoint's client destinations. By trending the typical number of ARP, broadcast, multicast and unknown unicast packets over a period of time, the average rate for each access category can be obtained. Once a baseline is obtained, administrators should then add a 10% margin (minimally) to allow for traffic bursts at the site. The default burst size is 320 kbytes. Contd.. |
rate-limit [meshpoint|neighbor] [from-air|to-air] {red-threshold [background <0-100>|best-effort <0-100>|video <0-100>|voice <0-100>]

For a neighbor: The smaller the burst, the less likely the transmit packet transmission will result in congestion for the wireless client. The default burst size is 64 kbytes.

rate <50-1000000>
Optional. Defines a receive or transmit rate limit in kilobytes per second
• <50-1000000> – Set a value from 50 - 1000000 kbps.

For a meshpoint: This limit constitutes a threshold for the maximum number of packets transmitted or received over the meshpoint (from all access categories). Traffic that exceeds the defined rate is dropped and a log message is generated. The default setting is 5000 kbps.

For a neighbor: This limit constitutes a threshold for the maximum number of packets transmitted or received (from all access categories). Traffic that exceeds the defined rate is dropped by the client and a log message is generated. The default rate is 1,000 kbps.

• rate-limit [meshpoint|neighbor] [from-air|to-air] {red-threshold [background <0-100>|best-effort <0-100>|video <0-100>|voice <0-100>]

| meshpoint | Configures rate limit parameters for a meshpoint |
| neighbor | Configures rate limit parameters for neighboring meshpoint devices |
| from-air | Configures rate limits for traffic from the wireless neighbor to the network |
| to-air | Configures rate limit value for traffic from the network to the wireless neighbor |
| red-threshold | Optional. Configures random early detection threshold (RED threshold) for traffic class |

background <0-100>
The following keyword is applicable to the ‘from-air’ and ‘to-air’ traffics.
• background <0-100> – Configures the threshold for low priority (background) traffic
  • <0-100> – Specify a value from 0 - 100.

For a meshpoint: This is a percentage of the maximum burst size for low priority traffic. Background traffic exceeding the defined threshold is dropped and a log message is generated. Background traffic consumes the least bandwidth of any access category, so this value can be set to a lower value once a general transmit rate is known by the network administrator (using a time trend analysis). The default threshold is 50%.

For a neighbor: This is a percentage of the maximum burst size for low priority traffic. Background traffic exceeding the defined threshold is dropped by the client and a log message is generated. The default threshold is 50%.

best-effort <0-100>
The following keyword is applicable to the ‘from-air’ and ‘to-air’ traffics.
• best-effort <0-100> – Configures the threshold for best effort traffic
  • <0-100> – Specify a value from 0 - 100.

For a meshpoint: This is a percentage of the maximum burst size for normal priority traffic. Best effort traffic exceeding the defined threshold is dropped and a log message is generated. Best effort traffic consumes little bandwidth, so this value can be set to a lower value once a general transmit rate is known by the network administrator (using a time trend analysis). The default threshold is 50%.

For a neighbor: This is a percentage of the maximum burst size for normal traffic. Best effort traffic exceeding the defined threshold is dropped by the client and a log message is generated. The default threshold is 50%.
video <0-100> The following keyword is applicable to the ‘from-air’ and ‘to-air’ traffics.
  • video <0-100> – Configures the threshold for video traffic
  • <0-100> – Specify a value from 0 - 100.

For a meshpoint: This is a percentage of the maximum burst size for video traffic. Video traffic exceeding the defined threshold is dropped and a log message is generated. Video traffic consumes significant bandwidth, so this value can be set to a higher value once a general transmit rate is known by the network administrator (using a time trend analysis). The default threshold is 25%.

For a neighbor: This is a percentage of the maximum burst size for video traffic. Video traffic exceeding the defined threshold is dropped by the client and a log message is generated. The default threshold is 25%.

voice <0-100> The following keyword is applicable to the ‘from-air’ and ‘to-air’ traffics.
  • voice <0-100> – Configures the threshold for voice traffic
  • <0-100> – Specify a value from 0 - 100.

For a meshpoint: This is a percentage of the maximum burst size for voice traffic. Voice traffic exceeding the defined threshold is dropped and a log message is generated. Voice applications consume significant bandwidth, so this value can be set to a higher value once a general upstream rate is known by the network administrator (using a time trend analysis). The default threshold is 0%.

For a neighbor: This is a percentage of the maximum burst size for voice traffic. Voice traffic exceeding the defined threshold is dropped by the client and a log message is generated. The default threshold is 0% and implies no early random drops will occur.

Examples
rfs7000-37FABE(config-meshpoint-qos-test)#rate-limit meshpoint from-air max-burst-size 800
rfs7000-37FABE(config-meshpoint-qos-test)#show context
meshpoint-qos-policy test
  rate-limit meshpoint from-air max-burst-size 800
  accelerated-multicast 224.0.0.1 classification video
rfs7000-37FABE(config-meshpoint-qos-test)#rate-limit meshpoint from-air rate 80000
rfs7000-37FABE(config-meshpoint-qos-test)#rate-limit meshpoint from-air red-threshold video 80
rfs7000-37FABE(config-meshpoint-qos-test)#rate-limit meshpoint from-air red-threshold voice 70
rfs7000-37FABE(config-meshpoint-qos-test)#show context
meshpoint-qos-policy test
  rate-limit meshpoint from-air rate 80000
  rate-limit meshpoint from-air max-burst-size 800
  rate-limit meshpoint from-air red-threshold video 80
  rate-limit meshpoint from-air red-threshold voice 70
  accelerated-multicast 224.0.0.1 classification video
rfs7000-37FABE(config-meshpoint-qos-test)#

Related Commands

no Resets traffic rate limit settings for this meshpoint QoS policy
26.3 meshpoint-device-config-instance

The following table lists the meshpoint device configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>meshpoint-device</td>
<td>Configures an access point as a meshpoint device and enters its configuration mode</td>
<td>page 26-35</td>
</tr>
<tr>
<td>meshpoint-device-commands</td>
<td>Invokes the meshpoint-device configuration commands</td>
<td>page 26-37</td>
</tr>
</tbody>
</table>
26.3.1 meshpoint-device

This command configures an access point to use a defined meshpoint. This command is available only under the AP622, AP650, AP6522, AP6532, AP71XX, AP81XX, AP82XX device or profile context. To configure this feature use one of the following options:

- navigate to the device profile config context (used when configuring access point profile on a controller)
- navigate to the device’s config context using the self command (used when configuring a logged on access point)

Supported in the following platforms:

- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622

Syntax

meshpoint-device <MESHPOINT-NAME>

Parameters

- meshpoint-device <MESHPOINT-NAME>

<table>
<thead>
<tr>
<th>meshpoint-device</th>
<th>Configures the AP as a meshpoint device and sets its parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MESHPOINT-NAME&gt;</td>
<td>The meshpoint to configure the AP with (should be existing and configured)</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config)#profile ap71xx AP71XXTestProfile
rfs7000-37FABE(config-profile-AP71XXTestProfile)#meshpoint-device test
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#

rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#?

Mesh Point Device Mode commands:

- acs: Configure auto channel selection parameters
- exclude: Exclude neighboring Mesh Devices
- hysteresis: Configure path selection SNR hysteresis values
- monitor: Event Monitoring
- no: Negate a command or set its defaults
- path-method: Path selection method used to find a root node
- preferred: Configure preferred path parameters
- root: Set this meshpoint as root
- root-select: Root selection method parameters
- clrscr: Clears the display screen
- commit: Commit all changes made in this session
- do: Run commands from Exec mode
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
- help: Description of the interactive help system
- revert: Revert changes
- service: Service Commands
- show: Show running system information
- write: Write running configuration to memory or terminal

rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#
ap7131-11E6C4(config-device-00-23-68-11-E6-C4-meshpoint-test)#meshpoint-device test
ap7131-11E6C4(config-device-00-23-68-11-E6-C4-meshpoint-test)#?

Mesh Point Device Mode commands:
acs Configure auto channel selection parameters
exclude Exclude neighboring Mesh Devices
hysteresis Configure path selection SNR hysteresis values
monitor Event Monitoring
no Negate a command or set its defaults
path-method Path selection method used to find a root node
preferred Configure preferred path parameters
root Set this meshpoint as root
root-select Root selection method parameters
clrscr Clears the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal

ap7131-11E6C4(config-device-00-23-68-11-E6-C4-meshpoint-test)#?
### 26.3.2 meshpoint-device-commands

The following table lists the meshpoint-device configuration mode commands:

**Table 26.4 Meshpoint-Device Config Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>acs</code></td>
<td>Enables Automatic Channel Selection (ACS) on this meshpoint device (access point)</td>
<td>page 26-38</td>
</tr>
<tr>
<td><code>exclude</code></td>
<td>Excludes neighboring mesh devices</td>
<td>page 26-43</td>
</tr>
<tr>
<td><code>hysteresis</code></td>
<td>Configures path selection SNR hysteresis values on this meshpoint-device (access point)</td>
<td>page 26-44</td>
</tr>
<tr>
<td><code>monitor</code></td>
<td>Enables monitoring of critical resource and primary port links on a meshpoint device</td>
<td>page 26-45</td>
</tr>
<tr>
<td><code>path-method</code></td>
<td>Configures the method used to select the path to the root node in a mesh network</td>
<td>page 26-46</td>
</tr>
<tr>
<td><code>preferred</code></td>
<td>Configures the preferred path parameters for a meshpoint device</td>
<td>page 26-47</td>
</tr>
<tr>
<td><code>root</code></td>
<td>Configures a meshpoint device as the root meshpoint</td>
<td>page 26-48</td>
</tr>
<tr>
<td><code>root-select</code></td>
<td>Configures this meshpoint device as the cost root</td>
<td>page 26-50</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negates the commands for a meshpoint device or resets values to default</td>
<td>page 26-51</td>
</tr>
</tbody>
</table>
Enables Automatic Channel Selection (ACS) on this meshpoint device (access point). When enabled, this feature automatically selects the best channel for a meshpoint-device radio based on the device configuration, channel conditions, and network layout.

In a wireless network deployment, it is advantageous for network devices to have the ability to operate in multiple channels and not be limited to only a single channel. Multiple channels increase the bandwidth and throughput of the wireless network. In such a scenario, each network device must have a mechanism to dynamically select a suitable channel of operation. ACS provides the required mechanism for a MCX enabled device.

Use this command to configure the ACS settings and override the default meshpoint configurations.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622

Syntax

```plaintext
acs [channel-hold-time|channel-switch-delta|channel-width|ocs-duration|ocs-frequency|path-min|path-threshold|preferred-interface-tolerance-period|preferred-radio-interface|priority-meshpoint|sample-count|snr-delta|signal-threshold|tolerance-period]
acs channel-hold-time [2.4GHz|5GHz] <0-86400>
acs channel-switch-delta [2.4GHz|5GHz] <5-35>
acs channel-width [2.4GHz|5GHz] [20MHz|40MHz|80MHz|auto]
acs ocs-duration [2.4GHz|5GHz] <20-250>
acs ocs-frequency [2.4GHz|5GHz] <1-60>
acs path-min [2.4GHz|5GHz] <100-20000>
acs path-threshold [2.4GHz|5GHz] <800-65535>
acs preferred-interface-tolerance-period [2.4GHz|5GHz] <10-600>
acs preferred-radio-interface [2.4GHz|5GHz] <0-2>
acs priority-meshpoint [2.4GHz|5GHz] <MESHPOINT-NAME>
acs sample-count [2.4GHz|5GHz] <1-10>
acs snr-delta [2.4GHz|5GHz] <1-100>
acs signal-threshold [2.4GHz|5GHz] <-100-0>
acs tolerance-period [2.4GHz|5GHz] <10-600>
```

Parameters

- `acs channel-hold-time [2.4GHz|5GHz] <0-86400>`

<p>| <code>acs</code> | Configures ACS settings and overrides on the selected meshpoint-device |</p>
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-hold-time</td>
<td>Configures the minimum time, in seconds, before a periodic scan, to assess channel conditions for a meshpoint root, is triggered.</td>
</tr>
<tr>
<td>[2.4GHz</td>
<td>5GHz] &lt;0-86400&gt;</td>
</tr>
<tr>
<td></td>
<td>- 5.0GHz – Configures the channel hold interval for the 5.0GHz radio band</td>
</tr>
<tr>
<td></td>
<td>The following keyword is common to the ‘2.4GHz’ and ‘5.0GHz’ bands:</td>
</tr>
<tr>
<td></td>
<td>- &lt;0-86400&gt; – Specify a value from 0 - 86400 seconds. The default is 1800 seconds.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> A value of ‘0’ disables periodic channel assessment.</td>
</tr>
</tbody>
</table>

- **acs channel-switch-delta [2.4GHz|5GHz] <5-35>**

channel-switch-delta          | Configures the difference in interference between the current and best channel needed to trigger a channel change. Once the difference in the current channel and the best channel interference equals the configured value, a channel change is triggered. |
| [2.4GHz|5GHz] <5-35>               | - 2.4GHz – Configures the channel switch delta for the 2.4GHz radio band  |
|                             | - 5.0GHz – Configures the channel switch delta for the 5.0GHz radio band  |
|                             | The following keyword is common to the ‘2.4GHz’ and ‘5.0GHz’ bands:      |
|                             | - <5-35> – Specify a value from 5 - 35 dBm. The default is 10 dBm.        |

- **acs channel-width [2.4GHz|5GHz] [20MHz|40MHz|80MHz|auto]**

channel-width                   | Configures the channel width that meshpoint auto channel selection assigns to the radio |
| [2.4GHz|5GHz] | [20MHz|40MHz|80MHz|auto] | - 2.4 GHz – Configures the operating channel width for the 2.4 GHz radio band  |
|                             | - 5.0 GHz – Configures the operating channel width for the 5.0 GHz radio band |
|                             | The following keywords are common to the ‘2.4 GHz’ and ‘5.0 GHz’ bands:   |
|                             | - 20 MHz – Assigns the 20 MHz channel width to the radio                  |
|                             | - 40 MHz – Assigns the 40 MHz channel width to the radio                  |
|                             | - 80 MHz – Assigns the 80 MHz channel width to the radio                  |
|                             | - auto – Selects and assigns the best possible channel from the 20/40/80 MHz width. This is the default setting. |

- **acs ocs-duration [2.4GHz|5GHz] <20-250>**

ocs-duration                   | Configures the duration, in milliseconds, of off-channel scans (OCSs)     |
| [2.4GHz|5GHz] | <20-250> | - 2.4 GHz – Configures the ocs-duration for the 2.4 GHz radio band       |
|                             | - 5.0 GHz – Configures the ocs-duration for the 5.0 GHz radio band        |
|                             | The following keyword is common to the ‘2.4 GHz’ and ‘5.0 GHz’ bands:    |
|                             | - <20-250> – Specify a value from 20 - 250 milliseconds. The default value is 50 milliseconds. |

- **acs ocs-frequency [2.4GHz|5GHz] <1-60>**
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ocs-frequency [2.4GHz</td>
<td>5GHz] &lt;1-60&gt;</td>
</tr>
<tr>
<td></td>
<td>• 2.4 GHz – Configures the ocs-frequency for the 2.4 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>• 5.0 GHz – Configures the ocs-frequency for the 5.0 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>The following keyword is common to the ’2.4 GHz’ and ’5.0 GHz’ bands:</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-60&gt; – Specify a value form 1 - 60 seconds. The default is 6 seconds.</td>
</tr>
<tr>
<td>acs path-min [2.4GHz</td>
<td>5GHz] &lt;100-20000&gt;</td>
</tr>
<tr>
<td></td>
<td>• 2.4 GHz – Configures the minimum root path metric for the 2.4 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>• 5.0 GHz – Configures the minimum root path metric for the 5.0 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>The following keyword is common to the ’2.4 GHz’ and ’5.0 GHz’ bands:</td>
</tr>
<tr>
<td></td>
<td>• &lt;100-20000&gt; – Specify a value from 100 - 20000. The default is 1000.</td>
</tr>
<tr>
<td>acs path-threshold [2.4GHz</td>
<td>5GHz] &lt;800-65535&gt;</td>
</tr>
<tr>
<td></td>
<td>• 2.4 GHz – Configures the root path metric threshold for the 2.4 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>• 5.0 GHz – Configures the root path metric threshold for the 5.0 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>The following keyword is common to the ’2.4 GHz’ and ’5.0 GHz’ bands:</td>
</tr>
<tr>
<td></td>
<td>• &lt;800-65535&gt; – Specify a value from 800 - 65535. The default is 1500.</td>
</tr>
<tr>
<td>acs preferred-interface-tolerance-period [2.4GHz</td>
<td>5GHz] &lt;10-600&gt;</td>
</tr>
<tr>
<td></td>
<td>• 2.4 GHz – Configures the maximum tolerance period for the 2.4 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>• 5.0 GHz – Configures the maximum tolerance period for the 5.0 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>The following keyword is common to the ’2.4 GHz’ and ’5.0 GHz’ bands:</td>
</tr>
<tr>
<td></td>
<td>• &lt;800-65535&gt; – Specify a value from 10 - 600 seconds.</td>
</tr>
<tr>
<td>acs preferred-radio-interface [2.4GHz</td>
<td>5GHz] &lt;0-2&gt;</td>
</tr>
<tr>
<td></td>
<td>• 2.4 GHz – Configures the preferred radio interface for the 2.4 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>• 5.0 GHz – Configures the preferred radio interface for the 5.0 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>The following keyword is common to the ’2.4 GHz’ and ’5.0 GHz’ bands:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-2&gt; – Specify a value form 0 - 2. A value of 0 (zero) indicates no preferred radio.</td>
</tr>
</tbody>
</table>
**acs priority-meshpoint** [2.4GHz|5GHz] <MESHPOINT-NAME>

| acs priority-meshpoint [2.4GHz|5GHz] <MESHPOINT-NAME> |
|--------------------------------------------------------|
| Configures ACS settings and overrides on the selected meshpoint-device. |
| Configures the priority meshpoint. Configuring a priority meshpoint overrides automatic meshpoint configuration. |
| • 2.4 GHz – Configures the priority meshpoint for the 2.4 GHz radio band |
| • 5.0 GHz – Configures the priority meshpoint for the 5.0 GHz radio band |
| The following keyword is common to the ‘2.4 GHz’ and ‘5.0 GHz’ bands: |
| • <MESHPOINT-NAME> – Specify the meshpoint name for the selected radio band. |

**acs sample-count** [2.4GHz|5GHz] <1-10>

| acs sample-count [2.4GHz|5GHz] <1-10> |
|----------------------------------------|
| Configures ACS settings and overrides on the selected meshpoint-device |
| Configures the minimum number of scan cycle samples to consider for auto channel selection |
| • 2.4 GHz – Configures the sample count for the 2.4 GHz radio band |
| • 5.0 GHz – Configures the sample count for the 5.0 GHz radio band |
| The following keyword is common to the ‘2.4 GHz’ and ‘5.0 GHz’ bands: |
| • <1-10> – Specify a value from 1 -10. The default is 5 samples. |

**acs snr-delta** [2.4GHz|5GHz] <1-100>

| acs snr-delta [2.4GHz|5GHz] <1-100> |
|--------------------------------------|
| Configures ACS settings and overrides on the selected meshpoint-device |
| Configures the channel SNR delta. A meshpoint on a candidate channel must have a SNR of a greater delta than the next hop on the current channel. |
| • 2.4 GHz – Configures the snr-delta for the 2.4 GHz radio band |
| • 5.0 GHz – Configures the snr-delta for the 5.0 GHz radio band |
| The following keyword is common to the ‘2.4 GHz’ and ‘5.0 GHz’ bands: |
| • <1-100> – Specify a value from 1 - 100 dB. The default is 5 dB. |

**acs signal-threshold** [2.4GHz|5GHz] <-100-0>

| acs signal-threshold [2.4GHz|5GHz] <-100-0> |
|---------------------------------------------|
| Configures ACS settings and overrides on the selected meshpoint-device |
| Configures the signal strength threshold. If the signal strength of the next hop drops below the configured signal-threshold, a scan is triggered. |
| • 2.4 GHz – Configures the signal-threshold for the 2.4 GHz radio band |
| • 5.0 GHz – Configures the signal-threshold for the 5.0 GHz radio band |
| The following keyword is common to the ‘2.4 GHz’ and ‘5.0 GHz’ bands: |
| • <-100-0> – Specify a value from -100 - 0 dB. The default is -65 dB. |

**acs tolerance-period** [2.4GHz|5GHz] <10-600>

| acs tolerance-period [2.4GHz|5GHz] <10-600> |
|---------------------------------------------|
| Configures ACS settings and overrides on the selected meshpoint-device |
| Configures the maximum tolerance period in seconds. This is the interval to wait for the root bound to recovery from a bad link. |
| • 2.4 GHz – Configures the tolerance-period for the 2.4 GHz radio band |
| • 5.0 GHz – Configures the tolerance-period for the 5.0 GHz radio band |
| The following keyword is common to the ‘2.4 GHz’ and ‘5.0 GHz’ bands: |
| • <10-600> – Specify a value from 10 - 600 seconds. The default is 60 seconds. |
Examples
rfs4000-229D58(config-profile-testAP71XX-meshpoint-test)#acs channel-hold-time 2.4GHz 2500
rfs4000-229D58(config-profile-testAP71XX-meshpoint-test)#acs ocs-duration 2.4GHz 30
rfs4000-229D58(config-profile-testAP71XX-meshpoint-test)#acs ocs-frequency 2.4GHz 1
rfs4000-229D58(config-profile-testAP71XX-meshpoint-test)#show context
        meshpoint-device test
        acs ocs-frequency 2.4GHz 1
        acs ocs-duration 2.4GHz 30
        acs channel-hold-time 2.4GHz 2500
rfs4000-229D58(config-profile-testAP71XX-meshpoint-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Reverts the configured ACS settings to default</td>
</tr>
</tbody>
</table>
26.3.2.2 exclude

▶ meshpoint-device-commands

Enables wired-peer (that are wired MiNT level-1 neighbors) exclusion

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622

Syntax
exclude wired-peer mint-level-1

Parameters
- exclude wired-peer mint-level-1

<table>
<thead>
<tr>
<th>exclude wired-peer</th>
<th>Excludes neighboring mesh devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>wired-peer mint-level-1</td>
<td>Excludes neighboring wired mesh devices with MiNTlevel-1 link When enabled, all neighboring wired mesh devices are excluded from mesh links.</td>
</tr>
</tbody>
</table>

Examples
rfs4000-229D58(config-profile-testAP71XX-meshpoint-test)#exclude wired-peer mint-level-1

rfs4000-229D58(config-profile-testAP71XX-meshpoint-test)#show context
meshpoint-device test
  exclude wired-peer mint-level-1
rfs4000-229D58(config-profile-testAP71XX-meshpoint-test)#

Related Commands

- no Disables wired-peer exclusion on this meshpoint
26.3.2.3 hysteresis

meshpoint-device-commands

Configures path selection SNR hysteresis values on this meshpoint-device (access point). These are settings that facilitate dynamic path selection. Configuring hysteresis prevents frequent re-ranking of the shortest path cost.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622

Syntax

hysteresis [min-threshold|period|root-sel-snr-delta|snr-delta]

Examples

rfs4000-229D58 (config-profile-testAP71XX-meshpoint-test)#hysteresis period 15
rfs4000-229D58 (config-profile-testAP71XX-meshpoint-test)#hysteresis root-sel-snr-delta 12
rfs4000-229D58 (config-profile-testAP71XX-meshpoint-test)#hysteresis snr-delta 3
rfs4000-229D58 (config-profile-testAP71XX-meshpoint-test)#hysteresis min-threshold -65

Related Commands

no

Removes the configured path selection SNR hysteresis values
26.3.2.4 `monitor`

- `<meshpoint-device-commands>`

Enables monitoring of critical resource and primary port links. It also configures the action taken in case a critical resource goes down or a primary port link is lost.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622

**Syntax**
```
monitor [critical-resource|primary-port-link-loss] action no-root
```

**Parameters**
- `monitor [critical-resource|primary-port-link-loss] action no-root`

<table>
<thead>
<tr>
<th>critical-resource</th>
<th>Enables critical resource down event monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary-port-link-loss</td>
<td>Enables primary port link loss event monitoring</td>
</tr>
<tr>
<td>action no-root</td>
<td>The following are common to all of the above:</td>
</tr>
<tr>
<td></td>
<td>• action – Sets the action taken if a critical resource goes down or if a primary port link is lost</td>
</tr>
<tr>
<td></td>
<td>• no-root – Changes the meshpoint to be non root (this is the action taken in case any of the above mentioned two events occur)</td>
</tr>
</tbody>
</table>

**Examples**
```
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#monitor critical-resource action no-root
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#show context
meshpoint-device test
    name test
    monitor critical-resource action no-root
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#
```

**Related Commands**
```
no
``` Disables monitoring of critical resource and primary port links.
26.3.2.5 path-method

meshpoint-device-commands

Configures the path selection method used on a meshpoint device. This is the method used to select the route to the root node within a mesh network.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622

Syntax

```
path-method [bound-pair|mobile-snr-leaf|snr-leaf|uniform]
```

Parameters

- **path-method [bound-pair|mobile-snr-leaf|snr-leaf|uniform]**

<table>
<thead>
<tr>
<th>path-method</th>
<th>Sets the method used to select the path to the root node in a mesh network</th>
</tr>
</thead>
<tbody>
<tr>
<td>bound-pair</td>
<td>Enables a meshpoint to form an exclusive path with only one other meshpoint. Select this option to bind one mesh point connection at a time. Once established, other mesh point connection requests are denied.</td>
</tr>
<tr>
<td>mobile-snr-leaf</td>
<td>Configures the path selection method as mobile-snr-leaf. When selected, the path to the root node is selected based on the Signal-to-Noise Ratio (SNR) to a neighboring device. This option allows meshpoint devices to select a neighbor with the strongest SNR. Meshpoint devices using the mobile-snr-leaf method are non-forwarding nodes in the meshpoint traffic. <strong>Note:</strong> Select this option for Vehicular Mounted Modem (VMM) access points or other mobile devices.</td>
</tr>
<tr>
<td>snr-leaf</td>
<td>This option allows meshpoints to select a neighbor with the strongest SNR. It is similar to the mobile-snr-leaf option, but is not applicable to mobile devices, such as VMMs.</td>
</tr>
<tr>
<td>uniform</td>
<td>Indicates the path selection method is uniform. When selected, two paths will be considered equivalent if the average goodput is the same for both paths. This is the default setting. <strong>Note:</strong> Select this option for infrastructure devices.</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#path-method mobile-snr-leaf
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#show context
meshpoint-device TEST
   name TEST
   path-method mobile-snr-leaf
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#
```

Related Commands

- **no** Resets the path selection method on a meshpoint device
26.3.2.6 preferred

meshpoint-device-commands

Configures the preferred path parameters for this meshpoint device

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622

Syntax
preferred [neighbor <MAC>|root <MAC>|interface [2.4GHz|4.9GHz|5GHz]]

Parameters
- preferred [neighbor <MAC>|root <MAC>|interface [2.4GHz|4.9GHz|5GHz]]

<table>
<thead>
<tr>
<th>preferred</th>
<th>Configures the preferred path parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>neighbor &lt;MAC&gt;</td>
<td>Adds the MAC address of a neighbor meshpoint as a preferred neighbor</td>
</tr>
<tr>
<td>root &lt;MAC&gt;</td>
<td>Adds the MAC address of a root meshpoint as a preferred root</td>
</tr>
<tr>
<td>interface [2.4GHz</td>
<td>4.9GHz</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#preferred neighbor 11-22-33-44-55-66
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#preferred root 22-33-44-55-66-77
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#preferred interface 5GHz
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#show context meshpoint-device test
  name test
  preferred root 22-33-44-55-66-77
  preferred neighbor 11-22-33-44-55-66
  preferred interface 5GHz
  monitor critical-resource action no-root
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#

Related Commands
- no | Removes the configuration of preferred paths for this meshpoint device |
26.3.2.7 root

meshpoint-device-commands

Configures this meshpoint device as the root meshpoint

You can optionally use the select-method option to enable dynamic mesh selection. When enabled, this option overrides root or no-root configuration and uses the selection method.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622

Syntax

root {select-method [auto-mint|auto-proximity]}

Parameters
- root {select-method [auto-mint|auto-proximity]}

<table>
<thead>
<tr>
<th>root</th>
<th>Configures this meshpoint device as the root meshpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>select-method</td>
<td>Optional. Enables dynamic mesh selection. When enabled, this option overrides root or no-root configuration and chooses the selection method.</td>
</tr>
<tr>
<td>auto-mint</td>
<td>• auto-mint – Enables dynamic root selection using Auto-MiNT (based on path cost)</td>
</tr>
</tbody>
</table>

Note: The Auto-Mint or Cost Method dynamically determines the root/non-root configuration of a meshpoint by:
- Monitoring and ranking the signal strength and path cost of neighboring mesh points.
- Setting the configuration to:
  - non-root: If the link with the shortest path to the cost-root mesh device is a MCX meshpoint link
  - root: If the link with the shortest path to the cost-root mesh device is a non MCX meshpoint link (wired link).
- This requires that the meshpoint device, in the brain car, be configured as the 'cost root' and the 'cost root' meshpoint-device be the l2 gateway to the controller. Use the root-select > cost-root command to configure a meshpoint-device as 'cost-root'.
- Using signal strength of neighboring meshpoint as the sole metric to determine the next mesh hop to the root.
- Loop detection with both meshpoints in a car select non-root and form a mesh link with the same root
- auto-proximity – Enables dynamic root selection using meshpoint proximity. When auto-proximity is selected, root selection is based on signal strength of candidate roots.

Examples

rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#root

rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#show context meshpoint-device test
  name test
  root
  preferred root 22-33-44-55-66-77
  preferred neighbor 11-22-33-44-55-66
  preferred interface 5GHz
  monitor critical-resource action no-root
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#
ap7131-11B6C4(config-device-00-23-68-11-E6-C4-meshpoint-test)#root select-method auto-mint

ap7131-11B6C4(config-device-00-23-68-11-E6-C4-meshpoint-test)#show context meshpoint-device test
root select-method auto-mint
ap7131-11B6C4(config-device-00-23-68-11-E6-C4-meshpoint-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes the configuration of this meshpoint device as a root meshpoint. Also allows you to disable dynamic mesh selection (if enabled).</td>
</tr>
</tbody>
</table>
### root-select

**meshpoint-device-commands**

Configures this meshpoint device as the cost root

Supported in the following platforms:

- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622

**Syntax**

```
root-select cost-root
```

**Parameters**

- `root-select cost-root`

**Examples**

```
ap7131-11E6C4(config-device-00-23-68-11-E6-C4-meshpoint-test)#root-select cost-root
```

```
ap7131-11E6C4(config-device-00-23-68-11-E6-C4-meshpoint-test)#show context
  meshpoint-device test
  root select-method auto-mint
  root-select cost-root
```

```
ap7131-11E6C4(config-device-00-23-68-11-E6-C4-meshpoint-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes this meshpoint-device as the cost-root</td>
</tr>
</tbody>
</table>
26.3.2.9 no

**meshpoint-device-commands**

Negates the commands for a meshpoint device or resets values to default.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP7532, AP7562, AP8132, AP8432, AP8533
- Access Points (as root APs only) — AP650, AP622

**Syntax**

```
no [acs|exclude|hysteresis|monitor|path-method|preferred|root|root-select]
no acs [channel-hold-time|channel-switch-delta|channel-width|ocs-duration|
ocs-frequency|path-min|path-threshold|preferred-interface-tolerance-period|
preferred-radio-interface|priority-meshpoint|sample-count|snr-delta|
signal-threshold|tolerance-period] [2.4GHz|5GHz]
no exclude wired-peer mint-level-1
no hysteresis [min-threshold|period|root-sel-snr-delta|snr-delta]
no monitor [critical-resource|primary-port-link-loss]
no [path-method|root {select-method}]
no root-select cost-root
no preferred [interface|root|neighbor]
```

**Parameters**

- `no <PARAMETERS>`

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes or reverts this meshpoint device settings to default based on the parameters passed</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#show context
meshpoint-device test
  name test
  root
  preferred root 22-33-44-55-66-77
  preferred neighbor 11-22-33-44-55-66
  preferred interface 5GHz
  monitor critical-resource action no-root
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#

rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#no monitor
critical-resource
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#no preferred neighbor
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#no root
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#no preferred interface
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#show context
meshpoint-device test
  name test
  no root
  preferred root 22-33-44-55-66-77
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#
```
There has been an exponential increase in the number and types of Wi-Fi mobile devices being used globally, resulting in a phenomenal growth in the data traffic volume. Consequently, the demand for secure, quick, and unlicensed access to public Wi-Fi hotspots, capable of handling this sudden influx of mobile data traffic, has been increasing. However, public hotspots have certain intrinsic usability issues, such as network discovery and selection, traffic prioritization, roaming capabilities, user authentication, etc. The IEEE 802.11u standards (includes Hotspot 2.0 protocol extensions) were introduced to address these issues.

Hotspot 2.0 is a Wi-Fi Alliance standard that enables interoperability between clients, infrastructure, and operators. It makes a portion of the IEEE 802.11u standard mandatory and adds Hotspot 2.0 extensions that allow clients to query a network before actually attempting to join it. For example, you are using a laptop at an airport and have a list of SSIDs to select from. You will have to first identify the SSID you have the credentials for and then connect to the network. This can be time consuming. In such a scenario, a Hotspot 2.0 enabled device would present only those SSIDs for which you possess credentials. In short Hotspot 2.0 allows devices to query a network for configuration details, such as WAN metrics, network type, hotspot service provider details, and domain names without actually connecting to the network.

Hotspot 2.0 enabled clients can identify a Hotspot 2.0 capable access point (AP) from the new elements present in the APs beacon/probe messages. Having ascertained that an AP is Hotspot 2.0 capable, the client uses action frames to send an Access Network Query Protocol (ANQP) query inside a Generic Advertisement Service (GAS) request. The AP responds with an action frame containing an ANQP response within a GAS response. Based on this response the mobile device determines the type of credentials needed to log on to the AP.

The WING Wi-Fi Alliance implementation defines a passpoint policy that allows a single or a set of Hotspot 2.0 configuration to be global and referenced by the devices that use it. This policy is applied to APs to make them Hotspot 2.0 Wi-Fi Alliance compliant. The passpoint policy is mapped to a WLAN. However, only primary WLANs on a BSSID will have their passpoint policy configuration used. For more information, see Chapter 4, GLOBAL CONFIGURATION COMMANDS.
To migrate to the passpoint policy configuration mode, use the following command:

```
<DEVICE>(config)#passpoint-policy <POLICY-NAME>
```

```
rfs4000-229D58(config)#passpoint-policy test
rfs4000-229D58(config-passpoint-policy-test)#
```

```
rfs4000-229D58(config-passpoint-policy-test)#?
```

Passpoint Policy Mode commands:

- **3gpp** Configure a 3gpp plmn (public land mobile network) id
- **access-network-type** Set the access network type for the hotspot
- **connection-capability** Configure the connection capability for the hotspot
- **domain-name** Add a domain-name for the hotspot
- **hessid** Set a homogeneous ESSID value for the hotspot
- **internet** Advertise the hotspot having internet access
- **ip-address-type** Configure the advertised ip-address-type
- **nai-realm** Configure a NAI realm for the hotspot
- **net-auth-type** Add a network authentication type to the hotspot
- **no** Negate a command or set its defaults
- **operator** Add configuration related to the operator of the hotspot
- **osu** Online signup
- **roam-consortium** Add a roam consortium for the hotspot
- **venue** Set the venue parameters of the hotspot
- **wan-metrics** Set the wan-metrics of the hotspot
- **clrscr** Clears the display screen
- **commit** Commit all changes made in this session
- **do** Run commands from Exec mode
- **end** End current mode and change to EXEC mode
- **exit** End current mode and down to previous mode
- **help** Description of the interactive help system
- **revert** Revert changes
- **service** Service Commands
- **show** Show running system information
- **write** Write running configuration to memory or terminal

```
rfs4000-229D58(config-passpoint-policy-test)#
```

---

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
27.1 passpoint-policy

The following table summarizes passpoint policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>3gpp</td>
<td>Configures a 3rd Generation Partnership Project (3gpp) Public Land Mobile Network (PLMN) ID</td>
<td>page 27-4</td>
</tr>
<tr>
<td>access-network-type</td>
<td>Configures the access network type element in this hotspot</td>
<td>page 27-5</td>
</tr>
<tr>
<td>connection-capability</td>
<td>Configures the connection capability element in this passpoint policy</td>
<td>page 27-6</td>
</tr>
<tr>
<td>domain-name</td>
<td>Configures the RF Domains to which this hotspot is applicable</td>
<td>page 27-8</td>
</tr>
<tr>
<td>hessid</td>
<td>Configures the Homogeneous Extended Service Set Identifier (HESSID) for a specified hotspot zone</td>
<td>page 27-9</td>
</tr>
<tr>
<td>internet</td>
<td>Advertises the availability of Internet access in this hotspot</td>
<td>page 27-10</td>
</tr>
<tr>
<td>ip-address-type</td>
<td>Advertises the IP address type used in this hotspot.</td>
<td>page 27-11</td>
</tr>
<tr>
<td>nai-realm</td>
<td>Configures a Network Access Identifier (NAI) realm name and enters its configuration mode</td>
<td>page 27-13</td>
</tr>
<tr>
<td>net-auth-type</td>
<td>Configures the network authentication type used in this hotspot</td>
<td>page 27-18</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts passpoint policy configuration</td>
<td>page 27-19</td>
</tr>
<tr>
<td>operator</td>
<td>Configures the operator friendly name for this hotspot</td>
<td>page 27-20</td>
</tr>
<tr>
<td>osu</td>
<td>Configures an online sign up (OSU) SSID/provider and enters its configuration mode</td>
<td>page 27-21</td>
</tr>
<tr>
<td>roam-consortium</td>
<td>Configures the list of Roaming Consortium Organization Identifiers (OIs) supported on this hotspot</td>
<td>page 27-31</td>
</tr>
<tr>
<td>venue</td>
<td>Configures the venue group and type for this passpoint policy</td>
<td>page 27-32</td>
</tr>
<tr>
<td>wan-metrics</td>
<td>Configures the WAN performance metrics for this hotspot</td>
<td>page 27-36</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
27.1.1 3gpp

`passpoint-policy`

Configures a 3rd Generation Partnership Project (3GPP) Public Land Mobile Network (PLMN) information. The 3GPP PLMN information is a combination of the Mobile Country Code (MCC) and Mobile Network Code (MNC). This MCC and MNC combination uniquely identifies a cellular operator. For example, Telstar Corporation Ltd. in Australia is identified by MCC 505 and MNC 001.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

Syntax

```
3gpp mcc <MOBILE-COUNTRY-CODE> mnc <MOBILE-NETWORK-CODE> {description <LINE>}
```

Parameters

- `3gpp mcc <MOBILE-COUNTRY-CODE> mnc <MOBILE-NETWORK-CODE> {description <LINE>}`

<table>
<thead>
<tr>
<th>3gpp</th>
<th>Configures the 3GPP PLMN information that is returned in response to an ANQP query</th>
</tr>
</thead>
<tbody>
<tr>
<td>mcc</td>
<td>Specifies the MCC. The MCC is a two or three digit decimal value. For example, the MCC for Australia is 505.</td>
</tr>
<tr>
<td>mnc</td>
<td>Specifies the MNC. The MNC is a two or three decimal value used in combination with the MCC to uniquely identify a mobile network operator. The MNC and MCC combination (also known as the MCC/MNC tuple) forms the first five or six digits of the International Mobile Subscriber’s Identity (IMSI). <strong>Note:</strong> If the MCC and MNC values are not configured, the hotspot will not return the element in an ANQP capability request and ignores any ANQP query for the element.</td>
</tr>
<tr>
<td>description &lt;LINE&gt;</td>
<td>Optional. Configures a description that uniquely identifies this PLMN. Provide a description not exceeding 64 characters in length.</td>
</tr>
</tbody>
</table>

Examples

```
rfs4000-229D58(config-passpoint-policy-test)#3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#3gpp mcc 310 mnc 970
rfs4000-229D58(config-passpoint-policy-test)#show context
hotspot2-policy test
  3gpp mcc 310 mnc 970
  3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#
```

Related Commands

- `no` Removes the specified 3gpp PLMN information and its corresponding MCC/MNC settings
27.1.2 **access-network-type**

This command configures the access network type for this hotspot. The beacons and probe responses communicate the type of hotspot (public, private, guest-use, emergency, etc.) to clients seeking access.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

```
access-network-type [chargeable-public|emergency-services|experimental|free-public|
personal-device|private|private-guest|wildcard]
```

**Parameters**

- **access-network-type [chargeable-public|emergency-services|experimental|free-public|
personal-device|private|private-guest|wildcard]**

<table>
<thead>
<tr>
<th>access-network-type</th>
<th>Select the access network type for this hotspot. The options are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• chargeable-public – The network type is a chargeable public network</td>
</tr>
<tr>
<td></td>
<td>• emergency-services – The network is used to provide emergency services only</td>
</tr>
<tr>
<td></td>
<td>• experimental – The network is used for test or experimental purposes only</td>
</tr>
<tr>
<td></td>
<td>• free-public – The network type is a free public</td>
</tr>
<tr>
<td></td>
<td>• personal-device – The network is used for personal devices only</td>
</tr>
<tr>
<td></td>
<td>• private – The network is a private network</td>
</tr>
<tr>
<td></td>
<td>• private-guest – The network is a private network with guest access (default setting)</td>
</tr>
<tr>
<td></td>
<td>• wildcard – Includes all access network types</td>
</tr>
</tbody>
</table>

**Note:** If the network type is set to chargeable-public, probe responses advertise this hotspot as a chargeable-public hotspot.

**Examples**

```
rfs4000-229D58(config-passpoint-policy-test)#access-network-type chargeable-public
rfs4000-229D58(config-passpoint-policy-test)#show context
hotspot2-policy_test
access-network-type chargeable-public
3gpp mcc 310 mnc 970
3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#
```

**Related Commands**

```
no | Reverts to the default access network type setting (private)
```
## 27.1.3 connection-capability

### passpoint-policy

Configures the connection capability element in this passpoint policy. When configured, it communicates which ports are open or closed on the Hotspot, in response to an ANQP query.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

### Syntax

```
connection-capability [ftp|http|icmp|ip-protocol|ipsec-vpn|pptp-vpn|sip|ssh|tls-vpn]
connection-capability [ftp|http|icmp|ip-protocol|ipsec-vpn|pptp-vpn|sip|ssh|tls-vpn]
    [closed|open|unknown]
connection-capability ip-protocol <0-255> port <0-65535> [closed|open|unknown]
```

### Parameters

- **connection-capability [ftp|http|icmp|ip-protocol|ipsec-vpn|pptp-vpn|sip|ssh|tls-vpn]**
  - `ftp` Specifies the protocol type as FTP. Configures TCP port 20.
  - `http` Specifies the protocol type as HTTP. Configures TCP port 80.
  - `icmp` Specifies the protocol type as ICMP.
  - `ipsec-vpn` Specifies the protocol type as IPSEC VPN. Configures ESP and UDP ports 500 and 4500.
  - `pptp-vpn` Specifies the protocol type as PPTP VPN. Configures TCP port 1723.
  - `sip` Specifies the protocol type as SIP. Configures TCP port 5060 and UDP port 5060.
  - `ssh` Specifies the protocol type as SSH. Configures TCP port 20
  - `tls-vpn` Specifies the protocol type as TLS VPN. Configures TCP port 443.

- **port <0-65535> [closed|open|unknown]** After specifying the protocol type, specify the port (associated with the selected protocol) and its status.
  - `closed` – Specifies that the port(s) is/are closed
  - `open` – Specifies that the port(s) is/are open
  - `unknown` – Specifies that the port(s) status is not known

**Note:** When the connection capability element is not configured, the hotspot does not return the element in an ANQP capability request and ignores any ANQP query for the element.

- **connection-capability ip-protocol <0-255> port <0-65535> [closed|open|unknown]**

### Parameters

- **connection-capability ip-protocol <0-255>**
  - `ip-protocol <0-255>` Identifies the IP protocol by the protocol’s number. For example, for simple message protocol (SMP) specify 121.
### Examples

```bash
rfs4000-229D58(config-passpoint-policy-test)#connection-capability 1 ip-protocol 2 port 10 closed

rfs4000-229D58(config-passpoint-policy-test)#show context
  hotspot2-policy test
  access-network-type chargeable-public
  connection-capability ip-protocol 2 port 10 closed
  3gpp mcc 310 mnc 970
  3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes the configured connection capability element on the passpoint policy</td>
</tr>
</tbody>
</table>
27.1.4 domain-name

Configures the RF Domain(s) that are returned in response to an ANQP query

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

Syntax
```
domain-name <DOMAIN-NAME>
```

Parameters
- domain-name <DOMAIN-NAME>

<table>
<thead>
<tr>
<th>domain-name &lt;DOMAIN-NAME&gt;</th>
<th>Specify the RF Domain name</th>
</tr>
</thead>
</table>

Note: An hotspot can be applied across multiple RF Domains.

Examples
```
rfs4000-229D58(config-passpoint-policy-test)#domain-name TechPubs
```
```
rfs4000-229D58(config-passpoint-policy-test)#show context
  hotspot2-policy test
  access-network-type chargeable-public
  connection-capability ip-protocol 2 port 10 closed
  domain-name TechPubs
  3gpp mcc 310 mnc 970
  3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#
```

Related Commands
```
no
```
Removes the RF Domain mapped to this passpoint policy
### 27.1.5 hessid

*passpoint-policy*

Configures the Homogeneous Extended Service Set Identifier (HESSID) for the hotspot. The HESSID uniquely identifies a hotspot provider within a zone. This is essential in zones (such as an airport or shopping mall) having multiple hotspot service providers with overlapping coverage.

An HESSID is a 6 (six) byte identifier that uniquely identifies a set of APs belonging to the same network and exhibiting same network behavior. It is the BSSID (MAC address) of one of the devices (AP) in the zone. When not configured, the radio’s BSSID is used as the HESSID.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

```
hessid <MAC>
```

**Parameters**

- `hessid <MAC>`

**Examples**

```
rfs4000-229D58(config-passpoint-policy-test)#hessid 00-23-68-88-0D-A7
```

```
rfs4000-229D58(config-passpoint-policy-test)#show context
hotspot2-policy test
  access-network-type chargeable-public
  connection-capability ip-protocol 2 port 10 closed
  domain-name TechPubs
  hessid 00-23-68-88-0D-A7
  3gpp mcc 310 mnc 970
  3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#
```

**Related Commands**

```
no
```

Removes the HESSID configured with this passpoint policy and reverts back to using the radio’s BSSID.
27.1.6 **internet**

Advertises the availability of Internet access on this hotspot. The Internet bit in the hotspot’s beacon and probe responses indicates if Internet access is available or not. By default this feature is enabled.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

```
internet
```

**Parameters**

None

**Examples**

```
rfs4000-229D58(config-passpoint-policy-test)#internet
rfs4000-229D58(config-passpoint-policy-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes Internet access on this passpoint policy</td>
</tr>
</tbody>
</table>
### 27.1.7 ip-address-type

**passpoint-policy**

Advertises the IP address type used in this hotspot. This information is returned in response to ANQP queries.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

```markdown
ip-address-type [ipv4|ipv6]

ip-address-type ipv4 [double-nat|not-available|port-restricted|
port-restricted-double-nat|port-restricted-single-nat|public|single-nat|unknown]

ip-address-type ipv6 [available|not-available|unknown]
```

**Parameters**

- `ip-address-type ipv4` [double-nat|not-available|port-restricted|port-restricted-double-nat|port-restricted-single-nat|public|single-nat|unknown]
- `ip-address-type ipv6` [available|not-available|unknown]

<table>
<thead>
<tr>
<th>ip-address-type ipv4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures the as IPv4 address type availability information</td>
<td></td>
</tr>
<tr>
<td>double-nat</td>
<td>Specifies double NATed private IPv4 address is available</td>
</tr>
<tr>
<td>not-available</td>
<td>Specifies IPv4 address is not available</td>
</tr>
<tr>
<td>port-restricted</td>
<td>Specifies port-restricted IPv4 address is available</td>
</tr>
<tr>
<td>port-restricted-double-nat</td>
<td>Specifies port-restricted IPv4 address and double NATed IPv4 address is available</td>
</tr>
<tr>
<td>port-restricted-single-nat</td>
<td>Specifies port-restricted IPv4 address and single NATed IPv4 address is available</td>
</tr>
<tr>
<td>public</td>
<td>Specifies public IPv4 address is available</td>
</tr>
<tr>
<td>single-nat</td>
<td>Specifies single NATed IPv4 address is available</td>
</tr>
<tr>
<td>unknown</td>
<td>Specifies no information configured regarding the IPv4 address availability</td>
</tr>
</tbody>
</table>

- `ip-address-type ipv6` [available|not-available|unknown]

<table>
<thead>
<tr>
<th>ip-address-type ipv6</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures the as IPv6 address type availability information</td>
<td></td>
</tr>
<tr>
<td>available</td>
<td>Specifies IPv6 address is available</td>
</tr>
<tr>
<td>not-available</td>
<td>Specifies IPv6 address is not available</td>
</tr>
<tr>
<td>unknown</td>
<td>Specifies no information configured regarding the IPv6 address availability</td>
</tr>
</tbody>
</table>
Examples

rfs4000-229D58 (config-passpoint-policy-test)#ip-address-type ipv6 available

rfs4000-229D58 (config-passpoint-policy-test)#show context hotspot2-policy_test
access-network-type chargeable-public
connection-capability ip-protocol 2 port 10 closed
domain-name TechPubs
hessid 00-23-68-88-0D-A7
ip-address-type ipv6 available
3gpp mcc 310 mnc 970
3gpp mcc 505 mnc 14
rfs4000-229D58 (config-passpoint-policy-test)#

Related Commands

| no                  | Removes the IP address type configured for this passpoint policy |
27.1.8 nai-realm

A Network Access Identifier (NAI) realm element in the passpoint policy identifies a hotspot service provider by the unique NAI realm name.

The following table lists NAI realm configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>nai-realm</td>
<td>Creates a NAI realm name for this hotspot and enters its configuration mode</td>
<td>page 27-14</td>
</tr>
<tr>
<td>nai-realm-config-mode commands</td>
<td>Invokes the NAI realm configuration mode commands</td>
<td>page 27-15</td>
</tr>
</tbody>
</table>
27.1.8.1 nai-realm

Configures a NAI realm name and enters its configuration mode. The NAI realm name identifies the accessible hotspot service providers. You can configure a list of NAI realm names of service providers operating within a specific hotspot zone. This NAI realm name list is presented in ANQP response to a NAI realm and NAI home realm query.

The configured NAI realm name list is presented in ANQP response to a NAI realm and NAI home realm query.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

```
nai-realm <HOTSPOT2-NAI-REALM-NAME>
```

**Parameters**

- `nai-realm <HOTSPOT2-NAI-REALM-NAME>`: Configures the NAI realm name for this passpoint policy

**Examples**

```
rfs4000-229D58(config-passpoint-policy-test)#nai-realm mail.example.com
rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.example.com)#
rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.example.com)##
```

Hotspot2 NAI Realm Mode commands:
- `eap-method`: Set an eap method
- `no`: Negate a command or set its defaults
- `clrscr`: Clears the display screen
- `commit`: Commit all changes made in this session
- `do`: Run commands from Exec mode
- `end`: End current mode and change to EXEC mode
- `exit`: End current mode and down to previous mode
- `help`: Description of the interactive help system
- `revert`: Revert changes
- `service`: Service Commands
- `show`: Show running system information
- `write`: Write running configuration to memory or terminal

```
rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.example.com)#exit
```

```
rfs4000-229D58(config-passpoint-policy-test)#show context
hotspot2-policy test
  access-network-type chargeable-public
  connection-capability ip-protocol 2 port 10 closed
  domain-name TechPubs
  hessid 00-23-68-88-0D-A7
  ip-address-type ipv6 available
  nai-realm mail.example.com
  nai-realm mail.testrealm.com
  3gpp mcc 310 mnc 970
  3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#
```

**Related Commands**

- `no`: Removes the NAI realm name configured for this passpoint policy
### 27.1.8.2 nai-realm-config-mode commands

The following table summarizes NAI realm configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>eap-method</td>
<td>Specifies the <em>Extensible Authentication Protocol</em> (EAP) authentication mechanisms supported by each of the service providers associated with this passpoint policy</td>
<td>page 27-16</td>
</tr>
</tbody>
</table>
27.1.8.2.1 eap-method

Specifies the EAP authentication mechanisms supported by each of the service providers associated with this passpoint policy.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

Syntax

```
 eap-method <1-10> [<1-255]|fast|gtc|identity|ikev2|ms-auth|mschapv2|otp|peap|psk|
  |rsa-public-key|sim|tls|ttls| auth-param [credential|expanded-eap|expanded-inner-eap|
  |inner-eap|non-eap-inner|tunn-eap-credential|vendor] [cert|hw-token|nfc-secure-elem|
  |none|sim|soft-token|username-password|usim|vendor]
```

Parameters

- `eap-method <1-10>` Creates an EAP authentication method and assigns it an index number
  - `<1-10>` – Specify a identifier for this EAP method from 1 - 10.
  - **Note:** A maximum of 10 (ten) authentication methods can be specified for every NAI realm. After creating the EAP authentication method, specify the associated authentication mechanisms (method types).

- `<1-255>` Identifies the EAP authentication method type from the corresponding Internet Assigned Numbers Authority (IANA) number
  - **Note:** `<1-255>` – Specify the IANA identity number for the authentication protocol from 1 - 255.

- `fast` Specifies the EAP authentication method type as Flexible Authentication via Secure Tunneling (FAST)

- `gtc` Specifies the EAP authentication method type as Generic Token Card (GTC)

- `identity` Specifies the EAP authentication method type as Identification

- `ikev2` Specifies the EAP authentication method type as Internet Key Exchange Protocol version 2 (IKEV2)

- `ms-auth` Specifies the EAP authentication method type as Microsoft Authentication (MS-Auth)

- `mschapv2` Specifies the EAP authentication method type as Microsoft Challenge Handshake Authentication Protocol version 2 (MSCHAPv2)

- `opt` Specifies the EAP authentication method type as One Time Password (OTP)

- `peap` Specifies the EAP authentication method type as Protected Extensible Authentication Protocol (PEAP)

- `psk` Specifies the EAP authentication method type as Pre-shared Key (PSK)

- `rsa-public-key` Specifies the EAP authentication method type as RSA public key protocol

- `sim` Specifies the EAP authentication method type as GSM Subscriber Identity Module (SIM)
### Examples

The following examples show four EAP authentication methods associated with the NAI realm ‘mail.example.com’. Each method supports a different EAP authentication mechanism:

rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.example.com)#eap-method 1
ttls auth-param vendor hex 00001E

rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.example.com)#eap-method 2
rsa-public-key auth-param credential cert

rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.example.com)#eap-method 4
peap auth-param credential cert

rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.example.com)#show context nai-realm mail.example.com
  eap-method 1 ttls auth-param vendor hex 00121F
  eap-method 2 rsa-public-key auth-param credential cert
  eap-method 3 otp auth-param credential username-password
  eap-method 4 peap auth-param credential cert

---

<table>
<thead>
<tr>
<th>tls</th>
<th>Specifies the EAP authentication method type as <em>Transport Layer Security (TLS)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>ttls</td>
<td>Specifies the EAP authentication method type as <em>Tunneled Transport Layer Security (TTLS)</em></td>
</tr>
<tr>
<td>auth-param</td>
<td>After specifying the EAP authentication method type, specify the authentication parameters. These parameters depend on the EAP authentication mechanism selected.</td>
</tr>
</tbody>
</table>
| [cert|hw-token|nfc-secure-elem|none|sim|soft-token|username-password|usim|vendor] | The following parameters are common to all the above authentication parameters:
  - cert – Certificate
  - hw-token – Hardware token
  - nfc-secure-elem – NFC secure element
  - none – No credential
  - sim – Subscriber identity module
  - soft-token – Soft token
  - username-password – Username and password
  - usim – Universal subscriber identity module
  - vendor – Vendor specific credential |
### 27.1.9 net-auth-type

#### passpoint-policy

Configures the network authentication type used in this hotspot. The details configured are returned in response to an ANQP query.

Supported in the following platforms:
- **Access Points** — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

```
net-auth-type [accept-terms|dns-redirect|http-redirect|online-enroll] {url <URL>}
```

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>net-auth-type</td>
<td>Specifies the network authentication type used with this passpoint policy. The options are: accept-terms, dns-redirect, http-redirect, and online-enroll</td>
</tr>
<tr>
<td>accept-terms</td>
<td>Enables user acceptance of terms and conditions</td>
</tr>
<tr>
<td>dns-redirect</td>
<td>Enables DNS redirection of user</td>
</tr>
<tr>
<td>http-redirect</td>
<td>Enables HTTP redirection of user</td>
</tr>
<tr>
<td>online-enroll</td>
<td>Enables online user enrolment</td>
</tr>
<tr>
<td>url &lt;URL&gt;</td>
<td>Optional. Specify the location for each of above network authentication types.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs4000-229D58(config-passpoint-policy-test)#net-auth-type accept-terms url "www.test.com"
rfs4000-229D58(config-passpoint-policy-test)#
```

```bash
rfs4000-229D58(config-passpoint-policy-test)#show context
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the network authentication type configured with this passpoint policy</td>
</tr>
</tbody>
</table>
27.1.10 **no**

- **passpoint-policy**

Removes or reverts the passpoint policy settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

no [3gpp|access-network-type|connection-capability|domain-name|hessid|internet|
    ip-address-type|nai-realm|net-auth-type|operator|osu|roam-consortium|venue|
    wan-metrics]

**Parameters**

- no `<PARAMETERS>`

---

**Examples**

The following example shows the passpoint policy 'test' settings before the 'no' commands are executed:

```bash
rfs4000-229D58(config-passpoint-policy-test)#show context
hotspot2-policy test
    access-network-type chargeable-public
    connection-capability ip-protocol 2 port 10 closed
    domain-name TechPubs
    hessid 00-23-68-88-0D-A7
    ip-address-type ipv6 available
    nai-realm mail.example.com
    eap-method 1 ttls auth-param vendor hex 00001E
    eap-method 2 rsa-public-key auth-param credential cert
    eap-method 3 otp auth-param credential username-password
    eap-method 4 peap auth-param credential cert
    nai-realm mail.testrealm.com
    net-auth-type accept-terms url www.test.com
    3gpp mcc 310 mnc 970
    3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#
```

```bash
rfs4000-229D58(config-passpoint-policy-test)#no access-network-type
rfs4000-229D58(config-passpoint-policy-test)#no hessid
rfs4000-229D58(config-passpoint-policy-test)#no nai-realm mail.example.com
rfs4000-229D58(config-passpoint-policy-test)#no 3gpp mcc 310 mnc 970
rfs4000-229D58(config-passpoint-policy-test)#no internet
rfs4000-229D58(config-passpoint-policy-test)#show context
hotspot2-policy test
    connection-capability ip-protocol 2 port 10 closed
    domain-name TechPubs
    no internet
    ip-address-type ipv6 available
    nai-realm mail.testrealm.com
    net-auth-type accept-terms url www.test.com
    3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#
```
27.1.11 operator

passpoint-policy

Configures the operator friendly name for this hotspot. The name can be configured in English or in any language other than English. When the name is specified in English, the system allows an ASCII input. If you are using a language other than English, first specify the ISO-639 language code, and then specify the name as an hexadecimal code.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000

Syntax

operator name <OPERATOR-NAME>

Parameters

- operator name <OPERATOR-NAME>

| name <OPERATOR-NAME> | Configures the operator’s name in English
|------------------------|-------------------------------|
| <OPERATOR-NAME>        | – Specify the operator friendly name in ASCII format.

Examples

rfs4000-229D58 (config-passpoint-policy-test)#operator name emergencyservices

rfs4000-229D58 (config-passpoint-policy-test)#show context
hotspot2-policy test
connection-capability ip-protocol 2 port 10 closed
domain-name TechPubs
no internet
ip-address-type ipv6 available
nai-realm mai.testrealm.com
net-auth-type accept-terms url www.test.com
operator name emergencyservices
3gp mcc 505 mnc 14
rfs4000-229D58 (config-passpoint-policy-test)#

Related Commands

no

Removes the operator friendly name configured for this passpoint policy
27.1.12  

The following table lists the OSU SSID/provider configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>osu</td>
<td>Configures an online sign up (OSU) SSID/provider and enters its configuration mode</td>
<td>page 27-22</td>
</tr>
<tr>
<td>osu-config-mode</td>
<td>Summarizes the OSU SSID/provider configuration mode commands</td>
<td>page 27-23</td>
</tr>
</tbody>
</table>
27.1.12.1 osu

Adds an online sign up (OSU) SSID (WLAN)/OSU provider and enters its configuration mode

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

Syntax

```
osi [provider <PASSPOINT-OSU-PROVIDER>|ssid <SSID>]
```

Parameters

- osu [provider <PASSPOINT-OSU-PROVIDER>|ssid <SSID>]

Examples

```
nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#
nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#?
```

Passpoint OSU Provider Mode commands:

- description Configure the english description of the online signup provider
- icon Add an icon for the online signup provider
- method Specify the online signup method supported by provider
- nai Configure the NAI for the online signup provider
- name Configure the english name of the online signup provider
- no Negate a command or set its defaults
- server-url Configure the signup url for the online signup provider

```
clrscr Clear the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
end End current mode and change to EXEC mode
exit End current mode and down to previous mode
help Description of the interactive help system
revert Revert changes
service Service Commands
show Show running system information
write Write running configuration to memory or terminal
```

Related Commands

```
no Removes the OSU WLAN/provider configured with this passpoint policy
```
27.1.12.2 osu-config-mode commands

The following table summarizes OSU SSID/provider configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Configures the OSU provider’s description</td>
<td>page 27-24</td>
</tr>
<tr>
<td>icon</td>
<td>Adds the OSU provider’s icon</td>
<td>page 27-25</td>
</tr>
<tr>
<td>method</td>
<td>Configures the open sign up methods available on this OSU provider</td>
<td>page 27-26</td>
</tr>
<tr>
<td>nai</td>
<td>Configures the OSU provider’s NAI</td>
<td>page 27-27</td>
</tr>
<tr>
<td>name</td>
<td>Configures the OSU provider’s name</td>
<td>page 27-28</td>
</tr>
<tr>
<td>no</td>
<td>Removes the settings configured for this OSU provider</td>
<td>page 27-29</td>
</tr>
<tr>
<td>server-url</td>
<td>Configures the OSU provider server’s URL</td>
<td>page 27-30</td>
</tr>
</tbody>
</table>
27.12.2.2 **description**

*osu-config-mode commands*

Configures the OSU SSID/provider’s description. This value is returned in the ANQP OSU providers list.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

description [DESCRIPTION|iso-lang <ISO-LANG-CODE>]

**Parameters**

- description [DESCRIPTION|iso-lang <ISO-LANG-CODE>]

| <DESCRIPTION> | Provides a description for the OSU provider. It should not exceed 253 characters in length.
| iso-lang <ISO-LANG-CODE> | Identifies the language by its ISO 639 language code (for example, ‘chi-chinese’ or ‘spa-spanish’). By default the language is set to English. If specifying the description in any language other than English, specify the ISO language code.

**Examples**

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#description "Provides free service for testing purposes"

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#show context osu provider WiFi

description "Provides free service for testing purposes"

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#

**Related Commands**

no | Removes this OSU provider’s description
### PASSPOINT POLICY 27-25

#### 27.1.12.2.3 icon

<table>
<thead>
<tr>
<th>osu-config-mode commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adds the OSU provider's icon. This value is returned in the ANQP OSU providers list.</td>
</tr>
</tbody>
</table>

**Supported in the following platforms:**
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

```plaintext
icon iso-lang <ISO-LANG-CODE> width <0-65535> height <0-65535>
    mime-type <FILE-MIME-TYPE> file [<IMAGE-FILE-NAMESPACE/PATH>|<FILE-NAME>]
```

**Parameters**

- **icon iso-lang <ISO-LANG-CODE> width <0-65535> height <0-65535> mime-type <FILE-MIME-TYPE> file [<IMAGE-FILE-NAMESPACE/PATH>|<FILE-NAME>]**

  - **icon iso-lang <ISO-LANG-CODE>** — Configures an icon representing the OSU provider
    - **<ISO-LANG-CODE>** — Identifies the language by its ISO 639 language code (for example, 'chi-chinese' or 'spa-spanish'). By default the language is set to English. If specifying the image file name and path in any language other than English, specify the ISO language code.

  - **width <0-65535>** — Configures the icon's width in pixels
    - **<0-65535>** — Specify a value from 0 - 65535 pixels.

  - **height <0-65535>** — Configures the icon's height in pixels
    - **<0-65535>** — Specify a value from 0 - 65535 pixels.

  - **mime-type <FILE-MIME-TYPE>** — Configures a string describing the icon's standard mime type. For example, image/png
    - **<FILE-MIME-TYPE>** — Specify the icon's mime type.

  - **file [<IMAGE-FILE-NAMESPACE/PATH>|<FILE-NAME>]** — Configures the location and name of the image file
    - **<IMAGE-FILE-NAMESPACE/PATH>|<FILE-NAME>** — Specify the path and filename. For example, flash:/icon.png
      - **<FILE-NAME>** — Use this option to specify the filename in the flash:/ directory

**Examples**

```plaintext
nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#icon iso-lang eng
width 128 height 128 mime-type image/png file flash:/wifi_icon

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#show context
osu provider WiFi
    description "Provides free service for testing purposes"
    icon iso-lang eng width 128 height 128 mime-type image/png file flash:/wifi_icon

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#
```

**Related Commands**

- **no** — Removes this OSU provider's icon
27.1.12.2.4 method

### osu-config-mode commands

Configures the open sign up methods available on this OSU provider. This value is returned, in the specified order of precedence, in the ANQP OSU providers list.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

### Syntax

```
method [oma-dm|soap-xml-spp] priority <1-2>
```

### Parameters

- **method [oma-dm|soap-xml-spp] priority <1-2>**

| method [oma-dm|soap-xml-spp] priority <1-2> | Configures the online sign up methods supported by this OSU provider |
|---------------------------------------------|---------------------------------------------------------------|
|                                             | • oma-dm – Configures the OSU method used as Open Mobile Alliance (OMA) device management |
|                                             | • soap-xml-spp – Configures the OSU method used as Soap-xml subscription provisioning protocol |
|                                             | • priority <1-2> – Sets the priority of the specified method. Select a value from 1 - 2. The default is one (1). |

### Examples

```bash
nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#method soap-xml-spp priority 1
```

```bash
nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#show context osu provider WiFi
description "Provides free service for testing purposes"
icon iso-lang eng width 128 height 128 mime-type image/png file flash:/wifi_icon
method soap-xml-spp priority 1
```

### Related Commands

| no | Removes the online sign up methods configured on this OSU provider |
27.1.12.2.5 nai

**osu-config-mode commands**

Configures the OSU provider’s NAI. This value is returned in the ANQP OSU providers list.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

nai <WORD>

**Parameters**

- nai <WORD>

<table>
<thead>
<tr>
<th>nai &lt;WORD&gt;</th>
<th>Configures the OSU provider’s NAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt;</td>
<td>— Specify the NAI.</td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#nai wifi.org

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#show context

osu provider WiFi
description "Provides free service for testing purposes"
icon iso-lang eng width 128 height 128 mime-type image/png file flash:/wifi_icon
method soap-xml-spp priority 1

nai wifi.org

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#

**Related Commands**

- **no** | Removes this OSU provider’s NAI |
27.1.12.2.6 name

osu-config-mode commands

Configures the OSU provider’s name. This value is returned in the ANQP OSU providers list.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

Syntax

name [<NAME>|iso-lang <ISO-LANG-CODE>]

Parameters

- name [<NAME>|iso-lang <ISO-LANG-CODE>]

Examples

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#name "WIFI Alliance OSU"
nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#show context
osu provider WiFi
  name "WIFI Alliance OSU"
  description "Provides free service for testing purposes"
  icon iso-lang eng width 128 height 128 mime-type image/png file flash:/wifi_icon
  method soap-xml-spp priority 1
  nai wifi.org
nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#

Related Commands

no | Removes this OSU provider’s name
27.1.12.2.7 no

- **osu-config-mode commands**

Removes the settings configured for this OSU provider. Once removed the information is not included in the ANQP providers list.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

```plaintext
no [description|icon|method|nai|name|server-url]
no [description|icon|name] {iso-lang <ISO-LANG-CODE>}
no [nai|server-url]
no method [oma-dm|soap-xml-spp]
```

**Parameters**

- no <PARAMETERS>

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes the settings configured for this OSU provider</th>
</tr>
</thead>
</table>

**Examples**

```plaintext
nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#show context
osu provider WiFi
  name "WIFI Alliance OSU"
  description "Provides free service for testing purposes"
  icon iso-lang eng width 128 height 128 mime-type image/png file flash:/wifi_icon
  method soap-xml-spp priority 1
  nai wifi.org
  server-url osu-server.wifi.org

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#no description

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#no icon iso-lang eng

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#no name

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#show context
osu provider WiFi
  method soap-xml-spp priority 1
  nai wifi.org
  server-url osu-server.wifi.org

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#
```
27.1.12.2.8 server-url

- **osu-config-mode commands**

  Configures the OSU provider server’s URL. This value is returned in the ANQP OSU providers list.

  Supported in the following platforms:
  - Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

    server-url <URL>

**Parameters**

- **server-url <URL>**

<table>
<thead>
<tr>
<th>server-url &lt;URL&gt;</th>
<th>Configures the OSU provider server’s URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;URL&gt;</td>
<td>Specify the server’s url.</td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#server-url osu-server.wifi.org

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#show context

   osu provider WiFi
   name "WIFI Alliance OSU"
   description "Provides free service for testing purposes"
   icon iso-lang eng width 128 height 128 mime-type image/png file flash:/wifi_icon
   method soap-xml-spp priority 1
   nai wifi.org
   
   server-url osu-server.wifi.org

nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#

**Related Commands**

- **no**

  Removes this OSU provider’s server’s URL
27.1.13 **roam-consortium**

 Configures a list of Roaming Consortium (RC) Organization Identifiers (OIs) supported on this hotspot. The beacons and probe responses communicate this Roaming Consortium list to devices. This information enables a device to identify the networks available through this AP.

Each OI identifies a either a group of Subscription Service Providers (SSPs) or a single SSP.

**Supported in the following platforms:**
- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms —NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

**Syntax**

roam-consortium hex <WORD>

**Parameters**

- roam-consortium hex <WORD>

<table>
<thead>
<tr>
<th>roam-consortium hex &lt;WORD&gt;</th>
<th>Adds a Roaming Consortium OI to this hotspot in hexadecimal format</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;WORD&gt; – Specify the Roaming Consortium OI in hexadecimal format (should not exceed 128 characters)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>hex &lt;WORD&gt;</th>
<th>Configures a hexadecimal input</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;WORD&gt; – Specify the Roaming Consortium OI in hexadecimal format (should not exceed 128 characters)</td>
</tr>
</tbody>
</table>

**Examples**

rfs4000-229D58(config-passpoint-policy-test)#roam-consortium hex 223344

rfs4000-229D58(config-passpoint-policy-test)#show context

hotspot2-policy test
connection-capability ip-protocol 2 port 10 closed
domain-name TechPubs
no internet
ip-address-type ipv6 available
nai-realm mai.testrealm.com
net-auth-type accept-terms url www.test.com
operator name emergencyservices
roam-consortium hex 223344
3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#

**Related Commands**

- no | Removes the Roaming Consortium OIs supported on this passpoint policy
27.1.14 venue

Configures the venue where this hotspot is located. The hotspot venue configuration informs prospective clients about the hotspot’s nature of activity, such as educational, institutional, residential, etc.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

Syntax

venue [group|name]

venue group [assembly|business|educational|industrial|institutional|mercantile|outdoor|residential|storage|unspecified|utility-and-misc|vehicular] type

venue name [<VENUE-NAME>|iso-lang]

venue name <VENUE-NAME>
venue name iso-lang <ISO-LANG-CODE> <VENUE-NAME>

Parameters

- venue group [assembly|business|educational|industrial|institutional|mercantile|outdoor|residential|storage|unspecified|utility-and-misc|vehicular] type

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>assembly type</td>
<td>Configures the venue group associated with this hotspot</td>
</tr>
<tr>
<td>type</td>
<td>Specifies the venue type for this group. The options are:</td>
</tr>
<tr>
<td>&lt;0-255&gt;</td>
<td>Specifies an unlisted venue type number from 0 -255</td>
</tr>
<tr>
<td>amphitheater</td>
<td>Specifies the venue type as amphitheater (4)</td>
</tr>
<tr>
<td>amusement-park</td>
<td>Specifies the venue type as amusement park (5)</td>
</tr>
<tr>
<td>arena</td>
<td>Specifies the venue type as arena (1)</td>
</tr>
<tr>
<td>bar</td>
<td>Specifies the venue type as bar (12)</td>
</tr>
<tr>
<td>coffee-shop</td>
<td>Specifies the venue type as a coffee shop (13)</td>
</tr>
<tr>
<td>convention-centre</td>
<td>Specifies the venue type as a convention center (7)</td>
</tr>
<tr>
<td>emergency-coordination-center</td>
<td>Specifies the venue type as an emergency coordination center (15)</td>
</tr>
<tr>
<td>library</td>
<td>Specifies the venue type as a library (8)</td>
</tr>
<tr>
<td>museum</td>
<td>Specifies the venue type as a museum (9)</td>
</tr>
<tr>
<td>passenger-terminal</td>
<td>Specifies the venue type as a passenger terminal (3)</td>
</tr>
<tr>
<td>place-of-worship</td>
<td>Specifies the venue type as a place of worship (6)</td>
</tr>
<tr>
<td>restaurant</td>
<td>Specifies the venue type as a restaurant (10)</td>
</tr>
<tr>
<td>stadium</td>
<td>Specifies the venue type as a stadium (2)</td>
</tr>
<tr>
<td>theater</td>
<td>Specifies the venue type as a theater (11)</td>
</tr>
<tr>
<td>unspecified</td>
<td>Specifies the venue type as not specified (0)</td>
</tr>
<tr>
<td>zoo</td>
<td>Specifies the venue type as a zoo (14)</td>
</tr>
<tr>
<td>Business Type</td>
<td>Configurations</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Business</td>
<td>Configures the venue group as business (2). This hotspot type is applicable to business venues.</td>
</tr>
<tr>
<td></td>
<td>• type – Specifies the venue type for this group. The options are:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
</tr>
<tr>
<td></td>
<td>• attorney – Specifies the venue type as the attorney's office (9)</td>
</tr>
<tr>
<td></td>
<td>• bank – Specifies the venue type as a bank (2)</td>
</tr>
<tr>
<td></td>
<td>• doctor – Specifies the venue type as a doctor or dentist's office (1)</td>
</tr>
<tr>
<td></td>
<td>• fire-station – Specifies the venue type as a fire station (3)</td>
</tr>
<tr>
<td></td>
<td>• police-station – Specifies the venue type as a police station (4)</td>
</tr>
<tr>
<td></td>
<td>• post-office – Specifies the venue type as a post office (5)</td>
</tr>
<tr>
<td></td>
<td>• professional-office – Specifies the venue type as a professional office (7)</td>
</tr>
<tr>
<td></td>
<td>• research-and-development-facility – Specifies the venue type as a research facility (8)</td>
</tr>
<tr>
<td></td>
<td>• unspecified – Specifies the venue type as not specified (0)</td>
</tr>
<tr>
<td>Educational</td>
<td>Configures the venue group as educational (3). This hotspot type is applicable to educational institutions.</td>
</tr>
<tr>
<td></td>
<td>• type – Specifies the venue type for this group. The options are:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
</tr>
<tr>
<td></td>
<td>• school-primary – Specifies the venue type as a primary school (1)</td>
</tr>
<tr>
<td></td>
<td>• school-secondary – Specifies the venue type as a secondary school (2)</td>
</tr>
<tr>
<td></td>
<td>• university – Specifies the venue type as a university or college (3)</td>
</tr>
<tr>
<td></td>
<td>• unspecified – Specifies the venue type as not specified (0)</td>
</tr>
<tr>
<td>Industrial</td>
<td>Configures the venue group as industrial (4). This hotspot type is applicable to industrial venues.</td>
</tr>
<tr>
<td></td>
<td>• type – Specifies the venue type for this group. The options are:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
</tr>
<tr>
<td></td>
<td>• factory – Specifies the venue type as a factory (1)</td>
</tr>
<tr>
<td></td>
<td>• unspecified – Specifies the venue type as not specified (0)</td>
</tr>
<tr>
<td>Institutional</td>
<td>Configures the venue group as institutional (4). This hotspot type is applicable to public health and other institutions.</td>
</tr>
<tr>
<td></td>
<td>• type – Specifies the venue type for this group. The options are:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
</tr>
<tr>
<td></td>
<td>• group-home – Specifies the venue type as a group-home (4)</td>
</tr>
<tr>
<td></td>
<td>• hospital – Specifies the venue type as a hospital (1)</td>
</tr>
<tr>
<td></td>
<td>• long-term-care – Specifies the venue type as a long term care facility (2)</td>
</tr>
<tr>
<td></td>
<td>• prison – Specifies the venue type as a prison or jail (5)</td>
</tr>
<tr>
<td></td>
<td>• rehab – Specifies the venue type as a rehabilitation facility (3)</td>
</tr>
<tr>
<td></td>
<td>• unspecified – Specifies the venue type as not specified (0)</td>
</tr>
<tr>
<td>Mercantile</td>
<td>Configures the venue group as mercantile (6). This hotspot type is applicable to public mercantile venues.</td>
</tr>
<tr>
<td></td>
<td>• type – Specifies the venue type for this group. The options are:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
</tr>
<tr>
<td></td>
<td>• automotive – Specifies the venue type as a automotive service center (3)</td>
</tr>
<tr>
<td></td>
<td>• gas-station – Specifies the venue type as a gas station (5)</td>
</tr>
<tr>
<td></td>
<td>• grocery – Specifies the venue type as a grocery store (2)</td>
</tr>
<tr>
<td></td>
<td>• mall – Specifies the venue type as a shopping mall (4)</td>
</tr>
<tr>
<td></td>
<td>• retail – Specifies the venue type as a retail store (1)</td>
</tr>
<tr>
<td></td>
<td>• unspecified – Specifies the venue type as not specified (0)</td>
</tr>
<tr>
<td>Venue Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>outdoor</td>
<td>Configures the venue group as outdoor (11). This hotspot type is applicable to public outdoor venues.</td>
</tr>
<tr>
<td>residential</td>
<td>Configures the venue group as residential (7). This hotspot type is applicable to residential complexes.</td>
</tr>
<tr>
<td>storage</td>
<td>Configures the venue group as storage (8). This hotspot type is applicable to storage groups.</td>
</tr>
<tr>
<td>unspecified</td>
<td>Configures the venue group as unspecified (0)</td>
</tr>
<tr>
<td>utility-and-misc</td>
<td>Configures the venue group as utility and miscellaneous (8)</td>
</tr>
<tr>
<td>vehicular</td>
<td>Configures the venue group as vehicular (7). This hotspot type is applicable to mobile venues.</td>
</tr>
</tbody>
</table>
operator name <VENUE-NAME>

name <WORD>  Configures the venue name in English
  • <WORD> – Specify the venue name in ASCII format.

operator name iso-lang <ISO-LANG-CODE> <VENUE-NAME>

name iso-lang <ISO-LANG-CODE> <VENUE-NAME>  Configures a non-English venue name
  • iso-lang <ISO-LANG-CODE> – Identifies the language by its ISO 639 language code (for example, ‘chi-chinese’ or ‘spa-spanish’).
  • <ISO-LANG-CODE> – Specify the 3 character iso-639 language code (for example, ‘chi-chinese’ or ‘spa-spanish’).
  • <VENUE-NAME> – Specifies the venue name as a hexadecimal code

Examples
rfs4000-229D58(config-passpoint-policy-test)#venue name PublicSchool
rfs4000-229D58(config-passpoint-policy-test)#venue group assembly type coffee-shop
rfs4000-229D58(config-passpoint-policy-test)#show context
  hotspot2-policy test
  connection-capability ip-protocol 2 port 10 closed
  domain-name TechPubs
  no internet
  ip-address-type ipv6 available
  nai-realm mai.testrealm.com
  net-auth-type accept-terms url www.test.com
  operator name emergencyservices
  roam-consortium hex 223344
  venue group assembly type coffee-shop
  venue name PublicSchool
  3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#

Related Commands

no  Removes the venue group and type configured with this passpoint policy
27.1.15 wan-metrics

Configures the WAN performance metrics for this hotspot. This command configures the upstream and downstream speeds associated with this hotspot. The upstream and downstream speed values (in Kbps) are estimates of the bandwidth available on the WAN. This information is returned in response to client ANQP query, and is useful for clients having a minimum and/or large bandwidth requirement.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX7500, NX7510, NX7520, NX7530, NX9000, NX9600

Syntax
wan-metrics down-speed <0-4294967295> up-speed <0-4294967295>

Parameters
- wan-metrics down-speed <0-4294967295> up-speed <0-4294967295>

Examples
rfs4000-229D58(config-passpoint-policy-test)#wan-metrics down-speed 2000 up-speed 2000
rfs4000-229D58(config-passpoint-policy-test)#show context
hotspot2-policy test
connection-capability ip-protocol 2 port 10 closed
domain-name TechPubs
no internet
ip-address-type ipv6 available
nai-realm mai.testrealm.com
net-auth-type accept-terms url www.test.com
operator name emergencyservices
roam-consortium hex 223344
venue group assembly type coffee-shop
venue name PublicSchool
wan-metrics down-speed 2000 up-speed 2000
3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#

Related Commands
no

Removes the WAN metrics configuration on this passpoint policy
CHAPTER 28
BORDER GATEWAY PROTOCOL

This chapter summarizes the Border Gateway Protocol (BGP) related configuration commands in the CLI command structure.

BGP is a routing protocol, which establishes routing between ISPs. ISPs use BGP to exchange routing information between Autonomous Systems (ASs) on the Internet. The routing information shared includes details, such as ASs traversed to a particular destination, reachable ASs, best paths available, network policies and rules applied on a route, etc. These details appear as BGP attributes carried in routing update packets. BGP uses this information to make routing decisions. Therefore, the primary role of a BGP system is to exchange routing information with other BGP peers.

BGP uses TCP as its transport protocol. This eliminates the need to implement explicit update fragmentation, retransmission, acknowledgement, and sequencing. BGP listens on TCP port 179. The error notification mechanism used in BGP assumes that TCP supports a graceful close (all outstanding data is delivered before the connection is closed). Routing information exchanged through BGP supports only destination-based forwarding (it assumes a router forwards packets based on the destination address carried in the IP header of the packet).

An AS is a set of routers under the same administration that use Interior Gateway Protocol (IGP) and common metrics to define how to route packets within the AS. There are two types of BGP systems: external BGP (eBGP) and internal BGP (iBGP). iBGP represents the exchange of routing information between BGP peers within an AS. Whereas, when two BGP peers, belonging to different ASs, are connected you have an eBGP setup.

BGP peers (also referred to as neighbors) are BGP enabled devices that are directly connected through an established TCP connection. When two BGP enabled peers establish a TCP connection the first time, they exchange their BGP routing tables. All subsequent route table modifications are exchanged as route updates. BGP tracks these route updates by maintaining route table version numbers. With every update the version number changes. At any given point in time, all BGP peers should have the same route table version. The peer-to-peer TCP connections are kept alive through keepalive packets exchanged at specified intervals. Errors and special events are communicated between peers as notification packets.

This chapter is organized as follows:

- `bgp-ip-prefix-list-config commands`
- `bgp-ip-access-list-config commands`
- `bgp-as-path-list-config commands`
- `bgp-community-list-config commands`
- `bgp-extcommunity-list-config commands`
- `bgp-route-map-config commands`
- `bgp-router-config commands`
- `bgp-neighbor-config commands`
NOTE: The input parameter <HOSTNAME>, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
28.1 bgp-ip-prefix-list-config commands

**BORDER GATEWAY PROTOCOL**

IP prefix lists are a convenient way to filter prefixes (contained in route update packets) transmitted to (or received from) other BGP supported routers. IP prefix lists are similar to access lists. They contain ordered entries (deny or permit prefix rules), identified by their sequence numbers. Each rule specifies match criteria (network and subnet prefixes and prefix masks) to match. When a prefix (received or transmitted) matches the prefix specified in one of the rules, it is filtered and an action is applied depending on where the IP prefix list is used. For example, when used in the BGP neighbor context, the prefixes received from the neighbor are filtered and the filtered prefixes are either rejected or accepted depending on the rule type (deny or permit).

IP prefix lists are also used in the BGP route map context to filter prefixes. The action applied, on filtered prefixes is set within the route map. Another use case for IP prefix lists is to filter prefixes before redistribution of local OSPF routes to eBGP enabled ASs.

Like in access lists, these deny and permit prefix rules are processed sequentially, in ascending order of their sequence number. Once a match is made, the BGP enabled router stops processing all subsequent rules in the ip-prefix-list.

IP prefix lists are used as match criteria in the following contexts:

- BGP neighbor. For more information, see `use`.
- BGP route-map context. For more information, see `match`.

To navigate to the ip-prefix-list configuration instance, use the following command:

```
<DEVICE>(config)#bgp ip-prefix-list <IP-PREFIX-LIST-NAME>
```

The following table summarizes the BGP IP prefix list configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny</td>
<td>Creates and configures a deny prefix-list rule</td>
<td>page 28-4</td>
</tr>
<tr>
<td>permit</td>
<td>Creates and configures a permit prefix-list rule</td>
<td>page 28-5</td>
</tr>
<tr>
<td>no</td>
<td>Removes the specified deny or permit prefix-list rule from this IP prefix list</td>
<td>page 28-6</td>
</tr>
</tbody>
</table>
28.1.1 deny

bgp-ip-prefix-list-config commands

Creates and configures a deny prefix-list rule. The deny rule specifies match criteria based on which prefixes received from (or transmitted to) a BGP neighbor are filtered. A deny action is applied on these filtered prefixes. For example, in the BGP router neighbor context a filter is applied using a IP prefix list. The list contains a deny rule with a prefix to match as 192.168.13.0/24. All prefixes received from the neighbor matching this prefix are denied.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax

```
deny prefix-list <1-4292967294> [<PREFIX-TO-MATCH/MASK>|any]
deny prefix-list <1-4292967294> [<PREFIX-TO-MATCH/MASK> {ge <0-32>|le <0-32>}|any]
```

Parameters

- `deny prefix-list <1-4292967294> [<PREFIX-TO-MATCH/MASK>|any]` creates and configures a deny prefix-list rule.
  - `<1-4294967295>` — Configures a sequence number for this deny rule. Specify a value from 1 - 4294967295. Within a prefix list, rules are applied in an ascending order of their sequence number. Rules with lower sequence number are applied first.
  - `<PREFIX-TO-MATCH/MASK>` — Specify the prefix to match. For example 10.0.0.0/8 or 192.168.13.0/24. Routes matching the specified prefix are filtered.
  - `ge <0-32>` — Optional. Specifies a greater than or equal to value for the IP prefix length (subnet mask)
  - `le <0-32>` — Optional. Specifies a less than or equal to value for the IP prefix length

**Note:** The 'ge' and 'le' options specify an IP prefix length range. Use these options to specify a more specific (granular) prefix match criteria.

- `any` — Sets the prefix match criteria to any. When selected, all routes are filtered, and the action applied is deny. At the backend, this option sets the match criteria to 0.0.0.0/0 le 32.

Examples

```
nx9500-6C8809(config-bgp-ip-prefix-list-test)#deny prefix-list 1 168.192.13.0/24
nx9500-6C8809(config-bgp-ip-prefix-list-test)#show context bgp ip-prefix-list test
deny prefix-list 1 168.192.13.0/24
nx9500-6C8809(config-bgp-ip-prefix-list-test)#
```

Related Commands

```
no
```

Removes a deny prefix-list rule from this IP prefix list
28.1.2 permit

`bgp-ip-prefix-list-config commands`

Creates and configures a permit prefix-list rule. The permit rule specifies match criteria based on which prefixes received from (or transmitted to) a BGP neighbor are filtered. A permit action is applied on these filtered prefixes. For example, in the BGP router neighbor context a filter is applied using a IP prefix list. The list contains a permit rule with a prefix to match as 172.168.10.0/24. All prefixes received from the neighbor matching this prefix are permitted.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax

`permit prefix-list <1-4294967295> [<PREFIX-TO-MATCH/MASK>|any]`

Parameters

- `permit prefix-list <1-4294967295> [<PREFIX-TO-MATCH/MASK>|any]`

Examples

```
nx9500-6C8809(config-bgp-ip-prefix-list-test)#permit prefix-list 2 172.122.10.0/24
```

**Note:** Use the ‘ge’ and ‘le’ options to specify a IP prefix length range. Use these options to specify a more specific (granular) prefix match criteria.

```
any – Sets the prefix match criteria to any. When selected, all routes are filtered, and the action applied is permit. At the backend, this option sets the match criteria to 0.0.0.0/0 le 32.
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes a permit prefix rule from this IP prefix list</td>
</tr>
</tbody>
</table>
28.1.3 no

- *bgp-ip-prefix-list-config commands*

Removes the specified deny or permit prefix-list rule from this IP prefix list

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

no [deny|permit]

no [deny|permit] prefix-list <1-4294967295> {<PREFIX-TO-MATCH/MASK>|any}

**Parameters**

- no <PARAMETERS>

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes a deny or permit rule from this IP prefix list</th>
</tr>
</thead>
</table>

**Examples**

The following example shows the IP prefix list ‘test’ settings before the ‘no’ command is executed:

```
nx9500-6C8809(config-bgp-ip-prefix-list-test)#show context
bgp ip-prefix-list test
deny prefix-list 1 168.192.13.0/24
permit prefix-list 2 172.122.10.0/24
nx9500-6C8809(config-bgp-ip-prefix-list-test)#
```

The following example shows the IP prefix list ‘test’ settings after the ‘no’ command is executed:

```
nx9500-6C8809(config-bgp-ip-prefix-list-test)#no deny prefix-list 1 168.192.13.0/24

nx9500-6C8809(config-bgp-ip-prefix-list-test)#show context
bgp ip-prefix-list test
  permit prefix-list 2 172.122.10.0/24
nx9500-6C8809(config-bgp-ip-prefix-list-test)#
```
28.2 bgp-ip-access-list-config commands

BGP peers and route maps can reference a single IP based access control list (ACL). Apply IP ACLs to both inbound and outbound route updates. When applied to a BGP enabled router, every route update is passed through the ACL. Each ACL contains deny and permit entries that are applied sequentially, in the order they appear within the list. When a route matches an entry, the decision to permit or deny the route is applied. Once a match is made the remaining entries in the ACL are not processed.

BGP IP ACLs are used as match criteria in the following contexts:

- BGP neighbor. For more information, see use.
- BGP route-map context. For more information, see match.

To navigate to the BGP IP ACL configuration instance, use the following command:

```
<DEVICE>(config)#bgp ip-access-list <IP-ACL-NAME>
```

BGP IP Access List Mode commands:

- **deny** Specify packets to reject
- **no** Negate a command or set its defaults
- **permit** Specify packets to forward
- **clrscr** Clears the display screen
- **commit** Commit all changes made in this session
- **do** Run commands from Exec mode
- **end** End current mode and change to EXEC mode
- **exit** End current mode and down to previous mode
- **help** Description of the interactive help system
- **revert** Revert changes
- **service** Service Commands
- **show** Show running system information
- **write** Write running configuration to memory or terminal

The following table summarizes the BGP IP access list configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny</td>
<td>Creates and configures a deny entry rule for this BGP IP ACL</td>
<td>page 28-8</td>
</tr>
<tr>
<td>permit</td>
<td>Creates and configures a permit entry for this BGP IP ACL</td>
<td>page 28-9</td>
</tr>
<tr>
<td>no</td>
<td>Removes a deny or permit entry from this BGP IP ACL</td>
<td>page 28-10</td>
</tr>
</tbody>
</table>
28.2.1 deny

**bgp-ip-access-list-config commands**

Creates and configures a deny entry for this BGP IP ACL

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

deny access-list [PREFIX-TO-MATCH/MASK] {exact-match} | any

**Parameters**

- deny access-list [PREFIX-TO-MATCH/MASK] {exact-match} | any

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny access-list</td>
<td>Creates and configures a deny entry for this BGP IP ACL</td>
</tr>
<tr>
<td>[PREFIX-TO-MATCH/MASK]</td>
<td>- Specify the prefix to match.</td>
</tr>
<tr>
<td>{exact-match}</td>
<td>- exact-match – Optional. Enables an exact match of the prefix provided in the previous step. When configured, the route is denied only in case of an exact match.</td>
</tr>
<tr>
<td></td>
<td>- any – Specifies the prefix to match as ‘any’.</td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C8809(config-bgp-ip-access-list-test)#deny access-list 192.168.13.0/24 exact-match

nx9500-6C8809(config-bgp-ip-access-list-test)#show context bgp ip-access-list test  
  deny access-list 192.168.13.0/24 exact-match

nx9500-6C8809(config-bgp-ip-access-list-test)#

**Related Commands**

- **no** Removes the specified the deny entry in this IP BGP ACL
28.2.2 **permit**

* bgp-ip-access-list-config commands

Creates and configures a permit entry for this BGP IP ACL

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

`permit access-list [<PREFIX-TO-MATCH/MASK> {exact-match}|any]`

**Parameters**

- `permit access-list [<PREFIX-TO-MATCH/MASK> {exact-match}|any]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>permit access-list</code></td>
<td>Creates and configures a permit entry for this BGP IP ACL</td>
</tr>
<tr>
<td><code>&lt;PREFIX-TO-MATCH/MASK&gt;</code></td>
<td>Specify the prefix to match.</td>
</tr>
<tr>
<td><code>exact-match</code></td>
<td>Optional. Enables an exact match of the prefix provided in the previous step. When configured, the route is permitted only in case of an exact match.</td>
</tr>
<tr>
<td><code>any</code></td>
<td>Specifies the prefix to match as ‘any’.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-bgp-ip-access-list-test)#permit access-list 172.168.10.0/24

nx9500-6C8809(config-bgp-ip-access-list-test)#show context bgp ip-access-list test
   permit access-list 172.168.10.0/24
   deny access-list 192.168.13.0/24 exact-match

nx9500-6C8809(config-bgp-ip-access-list-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the specified the permit entry in this IP BGP ACL</td>
</tr>
</tbody>
</table>
28.2.3 no

**bgp-ip-access-list-config commands**

Removes a deny or permit entry from this BGP IP ACL

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

no [deny|permit]

no [deny|permit] access-list [<PREFIX-TO-MATCH/MASK>|any]

**Parameters**

- no <PARAMETERS>

| no <PARAMETERS> | Removes a deny or permit entry from this BGP IP ACL |

**Examples**

The following example shows the BGP IP ACL 'test' settings before the 'no' command is executed:

```
nx9500-6C8809(config-bgp-ip-access-list-test)#show context bgp ip-access-list test
permit access-list 172.168.10.0/24
deny access-list 192.168.13.0/24 exact-match
```

```
nx9500-6C8809(config-bgp-ip-access-list-test)#no permit access-list 172.168.10.0/24
```

The following example shows the BGP IP ACL 'test' settings after the 'no' command is executed:

```
nx9500-6C8809(config-bgp-ip-access-list-test)#show context bgp ip-access-list test
deny access-list 192.168.13.0/24 exact-match
```

```
nx9500-6C8809(config-bgp-ip-access-list-test)#no permit access-list 172.168.10.0/24
```
### 28.3 bgp-as-path-list-config commands

BGP enabled devices use routing updates to exchange network routing information with each other. This information includes route details, such as the network number, path specific attributes, and the list of Autonomous System Numbers (ASNs) that a route traverses to reach a destination. This list is contained in the AS path.

An AS path access control list (ACL) filters AS paths (routes) included in routing updates. Each AS path access list consists of deny and/or permit rules that define regular expressions (match criteria). When configured and applied on inbound and outbound routing updates, the BGP AS path attributes are matched against the regular expressions specified in the AS path ACL. In case of a match, the route is filtered and an action (deny or permit) is applied. Once a match is made subsequent rules in the AS path access list are not processed.

AS path access lists also help prevent looping within an AS. Routing loops are prevented by rejecting routing updates containing local ASNs. Since local ASNs indicate that the route has already traveled through that autonomous system, by rejecting them looping is avoided.

AS path access lists are used as match criteria in the following contexts:

- BGP neighbor. For more information, see use.
- BGP route map context. For more information, see match.

To navigate to the AS path configuration instance, use the following command:

```plaintext
<DEVICE>(config)#bgp as-path <AS-PATH-LIST-NAME>
```

#### BGP AS Path List Mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny</td>
<td>Specifies packets to reject</td>
<td>page 28-12</td>
</tr>
<tr>
<td>permit</td>
<td>Specifies packets to forward</td>
<td>page 28-13</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
<td>page 28-14</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
<td></td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
<td></td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
<td></td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
<td></td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
<td></td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
<td></td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
<td></td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
<td></td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
<td></td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
<td></td>
</tr>
</tbody>
</table>

The following table summarizes the BGP AS path list configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny</td>
<td>Creates and configures a deny as-path-list rule</td>
<td>page 28-12</td>
</tr>
<tr>
<td>permit</td>
<td>Creates and configures a permit as-path-list rule</td>
<td>page 28-13</td>
</tr>
<tr>
<td>no</td>
<td>Removes a deny or permit rule from this AS path ACL</td>
<td>page 28-14</td>
</tr>
</tbody>
</table>
### 28.3.1 deny

**bgp-as-path-list-config commands**

Creates and configures a deny as-path-list rule. The deny rule specifies a regular expression to match. This regular expression, a string against the BGP AS paths contained in routing updates. AS paths matching the provided string are filtered and a deny action is applied.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

deny as-path <REG-EXP>

**Parameters**
- deny as-path <REG-EXP>

**Usage Guidelines**

The following table lists some of the characters used in forming regular expressions:

<table>
<thead>
<tr>
<th>Character to use</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>^</td>
<td>Indicates the start of a string</td>
</tr>
<tr>
<td>$</td>
<td>Indicates the end of a string</td>
</tr>
<tr>
<td>_ (underscore)</td>
<td>Indicates a comma, left brace, right brace, start and end of an input string, or a space. For example, “_ _”.</td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C8809(config-bgp-as-path-list-test)#deny as-path ^100$

nx9500-6C8809(config-bgp-as-path-list-test)#show context bgp as-path-list test
deny as-path ^100$
nx9500-6C8809(config-bgp-as-path-list-test)#

**Related Commands**

- **no** Removes the specified deny as-path ACL rule
28.3.2 permit

> bgp-as-path-list-config commands

Creates and configures a permit as-path-list rule. The permit rule specifies a regular expression to match. This regular expression is matched against the BGP AS paths contained in routing updates. AS paths matching the provided string are filtered and a permit action is applied.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax

```
permit as-path <REG-EXP>
```

Parameters

- `permit as-path <REG-EXP>`

Usage Guidelines

The following table lists some of the characters used in forming regular expressions:

<table>
<thead>
<tr>
<th>Character to use</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>^</td>
<td>Indicates the start of a string</td>
</tr>
<tr>
<td>$</td>
<td>Indicates the end of a string</td>
</tr>
<tr>
<td>_ (underscore)</td>
<td>Indicates a comma, left brace, right brace, start and end of an input string, or a space. For example, “_.”</td>
</tr>
</tbody>
</table>

Examples

```
nx9500-6C8809(config-bgp-as-path-list-test)#permit as-path _200_
nx9500-6C8809(config-bgp-as-path-list-test)#permit as-path _323_
nx9500-6C8809(config-bgp-as-path-list-test)#show context bgp as-path-list test
deny as-path ^100$
permit as-path _323_
permit as-path _200_
nx9500-6C8809(config-bgp-as-path-list-test)#
```

Related Commands

- `no` Removes the specified permit as-path ACL rule
28.3.3 no

- bgp-as-path-list-config commands

Removes a deny or permit rule from this AS path ACL

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax
no as-path-list [deny|permit] <REG-EXP>

Parameters
- no <PARAMETERS>

| no <PARAMETERS> | Removes a deny or permit rule from this AS path ACL |

Examples
nx9500-6C8809(config-bgp-as-path-list-test)#show context
bgp as-path-list test
deny as-path ^100$
  permit as-path _323_
permit as-path _200_
nx9500-6C8809(config-bgp-as-path-list-test)#

nx9500-6C8809(config-bgp-as-path-list-test)#no permit as-path _323_
nx9500-6C8809(config-bgp-as-path-list-test)#show context
bgp as-path-list test
deny as-path ^100$
  permit as-path _200_
nx9500-6C8809(config-bgp-as-path-list-test)#
28.4 bgp-community-list-config commands

BORDER GATEWAY PROTOCOL

Creates and configures a named community list

IP BGP routes have a set of attributes, mandatory and optional. The community and extended community attributes are optional. Optional attributes are specified by network administrators to mark (color) routes received in updates containing these attributes. These marked routes are filtered and special actions applied (accepted, preferred, distributed, or advertised). For example, the NO_EXPORT community, indicates that routes attached to it are local and not to be advertised to external ASs. Similarly, a set of routes using a common routing policy can be tagged to a community, and the policy applied to the community.

A BGP community is a group of routes sharing common attributes. Route updates contain community information in the form of path attributes. These attributes help identify community members.

A BGP community list is a list of deny or permit entries. It is either assigned a name (regular expressions, predefined community names) or a number. Assigning names to communities increases the number of configurable community lists. All rules applicable to numbered communities apply to named communities too. The only difference being in the number of attributes configurable for a named community list.

Since the community attribute is optional, it is shared only between devices that understand communities and are configured to handle communities. By default the community attribute is not sent to neighbors unless the send-community command option is enabled in the BGP neighbor context. For more information, see send-community.

Some of the predefined, globally used communities are:

- no-export – Routes tagged to this community are not advertised to external BGP peers
- no-advertise – Routes tagged to this community are not advertised to any BGP peers
- local-as – Routes tagged to this community are not advertised outside the local AS
- internet – Routes tagged to this community are advertised to the internet community. By default all BGP enabled devices belong to this community.

BGP community lists are used in the following context as match clauses:

- BGP route map context. For more information, see match.

To navigate to the BGP community configuration instance, use the following command:

```
<DEVICE>(config)#bgp community-list <COMMUNITY-LIST-NAME>
```

```
<DEVICE>(config-bgp-community-list-<COMMUNITY-LIST-NAME>)#?
```

BGP Community List Mode commands:

deny     Add a BGP Community List deny rule to Specify community to reject
no       Negate a command or set its defaults
permit   Add a BGP Community List permit rule to Specify community to accept
clrscr   Clears the display screen
commit   Commit all changes made in this session
do      Run commands from Exec mode
end      End current mode and change to EXEC mode
exit     End current mode and down to previous mode
help     Description of the interactive help system
revert   Revert changes
service  Service Commands
show     Show running system information
write    Write running configuration to memory or terminal

```
<DEVICE>(config-bgp-community-list-<COMMUNITY-LIST-NAME>)#`
```
The following table summarizes the BGP community list configuration commands:

**Table 28.4  BGP-Community-List-Config Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny</td>
<td>Creates and configures a deny community (expanded or standard) rule</td>
<td>page 28-17</td>
</tr>
<tr>
<td>permit</td>
<td>Creates and configures a permit community (expanded or standard) rule</td>
<td>page 28-19</td>
</tr>
<tr>
<td>no</td>
<td>Removes an existing deny or permit community rule from this community list</td>
<td>page 28-21</td>
</tr>
</tbody>
</table>
### 28.4.1 deny

**bgp-community-list-config commands**

Creates and configures a deny community (expanded or standard) rule

Standard community lists specify known communities and community numbers. Expanded community lists filter communities using a regular expression that specifies patterns to match the attributes of different communities.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

deny community [expanded|standard]

deny community expanded <LINE>

deny community standard [AA:NN|internet|local-AS|no-advertise|no-export]

**Parameters**

- deny community expanded <LINE>
  - Configures a deny expanded community list entry and associates it with a regular expression to match. The regular expression represents the patterns to match in the community attributes.
  - <LINE> – Provide the regular expression.

- deny community standard [AA:NN|internet|local-AS|no-advertise|no-export]
  - Configures a deny standard community list entry and associates it with a predefined, globally used, known community or community number. The options are:
    - aa:nn - Configures the community number. The first part (aa) represents the AS number. The second part (nn) represents a 2-byte number.
    - internet – Advertises this route to the internet community
    - local-AS – Prevents transmission of this route outside the local AS
    - no-advertise – Prevents advertisement of this route to any peer (internal or external
    - no-export – Prevents advertisement of this route to external BGP peers (keeping this route within an AS)

**Examples**

```
nx9500-6C8809(config-bgp-community-list-test)#deny community expanded 100

nx9500-6C8809(config-bgp-community-list-test)#show context
bgp community-list test
  deny community expanded 100

nx9500-6C8809(config)#show context

```

```bash
! Configuration of NX9500 version 5.8.4.0-008D
!
! version 2.5
!
! ip-prefix-list PrefixList_01
  deny prefix-list 1 192.163.0.0/16 ge 17 le 17
!
bgp ip-prefix-list test
```
```
deny prefix-list 1 168.192.13.0/24
permit prefix-list 2 172.122.10.0/24
!
bgp community-list test
deny community expanded 100
!
--More--
nx9500-6C8809(config)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes the specified deny community rule from this community list</td>
</tr>
</tbody>
</table>
28.4.2 permit

**bgp-community-list-config commands**

Creates and configures a permit community (expanded or standard) rule

Standard community lists specify known communities and community numbers. Expanded community lists filter communities using a regular expression that specifies patterns to match the attributes of different communities.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

permit community [expanded|standard]

permit community expanded <LINE>

permit community standard [AA:NN|internet|local-AS|no-advertise|no-export]

**Parameters**

- **permit community expanded <LINE>**
  - Configures a permit expanded community list entry and associates it with a regular expression to match. The regular expression represents the patterns to match in the community attributes.
  - <LINE> – Provide the regular expression.

- **permit community standard [AA:NN|internet|local-AS|no-advertise|no-export]**
  - Configures a permit standard community list entry and associates it with a predefined, globally used, known community or community number. The options are:
    - aa:nn – Configures the community number. The first part (aa) represents the AS number. The second part (nn) represents a 2-byte number.
    - internet – Advertises this route to the internet community
    - local-AS – Prevents transmission of this route outside the local AS
    - no-advertise – Prevents advertisement of this route to any peer (internal or external
    - no-export – Prevents advertisement of this route to external BGP peers (keeping this route within an AS)

**Examples**

nx9500-6C8809(config-bgp-community-list-test)#permit community expanded 300

nx9500-6C8809(config-bgp-community-list-test)# show context

permit community expanded 300
deny community expanded 100

nx9500-6C8809(config-bgp-community-list-test1)#permit community standard no-export

nx9500-6C8809(config-bgp-community-list-test1)#show context

permit community standard no-export

nx9500-6C8809(config-bgp-community-list-test1)#
nx9500-6C8809(config)#show context
!
! Configuration of NX9500 version 5.8.4.0-008D!
! version 2.5
!
........................................................
!
bgp ip-prefix-list PrefixList_01
    deny prefix-list 1 192.163.0.0/16 ge 17 le 17
!
bgp ip-prefix-list test
    deny prefix-list 1 168.192.13.0/24
    permit prefix-list 2 172.122.10.0/24
!
bgp community-list test
    permit community expanded 300
    deny community expanded 100
!
bgp community-list test1
    permit community standard no-export
!
--More--
nx9500-6C8809(config)#

**Related Commands**

| **no**       | Removes the specified permit community rule from this community list |
28.4.3 no

- bgp-community-list-config commands

Removes a deny or permit community rule from this community list

Supported in the following platforms:
  - Wireless Controllers — RFS4000, RFS6000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
no [deny|permit] community expanded <LINE>
no [deny|permit] community standard [AA:NN|internet|local-AS|no-advertise|no-export]
```

**Parameters**

- `no <PARAMETERS>`

<table>
<thead>
<tr>
<th>no &lt;PARAMETERS&gt;</th>
<th>Removes a deny or permit expanded community rule from this community list</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;LINE&gt;</td>
<td>&lt;LINE&gt; – Specify the regular expression associated with the rule.</td>
</tr>
</tbody>
</table>

**Examples**

The following example shows the settings of the community list ‘test’ before the ‘no’ command is executed:

```plaintext
nx9500-6C8809(config-bgp-community-list-test)#show context
bgp community-list test
  permit community expanded 300
  deny community expanded 100
nx9500-6C8809(config-bgp-community-list-test)#
```

```plaintext
nx9500-6C8809(config-bgp-community-list-test)#no deny community expanded 100
```

The following example shows the settings of the community list ‘test’ after the ‘no’ command is executed:

```plaintext
nx9500-6C8809(config-bgp-community-list-test)#show context
bgp community-list test
  permit community expanded 300
nx9500-6C8809(config-bgp-community-list-test)#
```
28.5 bgp-extcommunity-list-config commands

**BORDER GATEWAY PROTOCOL**

Creates an extended community list

A BGP extended community is a group of routes sharing a common attribute, regardless of their network or physical boundary. By using a BGP extended community attribute, routing policies can implement inbound or outbound route filters based on the extended community tag, rather than a long list of individual permit or deny rules. A BGP extended community list is used to create groups of communities to use in a match clause of a route map. An extended community list is used to control which routes are accepted, preferred, distributed, or advertised.

The BGP extended community and standard community attributes are identical in function and structure, except that the former is an eight octet and the latter is a four octet attribute.

BGP extended community lists are used as match clauses in the following context:

- BGP route map context. For more information, see *match*.

To navigate to the extended community configuration instance, use the following command:

```
<DEVICE>(config)#bgp extcommunity-list <EXTCOMMUNITY-LIST-NAME>
```

```
<DEVICE>(config-bgp-extcommunity-list-<EXTCOMMUNITY-LIST-NAME>)#?
```

**BGP Extcommunity List Mode commands**:

- **deny**  Add a BGP Community List deny rule to specify extcommunity to reject
- **no**  Negate a command or set its defaults
- **permit**  Add a BGP Community List permit rule to specify extcommunity to accept
- **clrscr**  Clears the display screen
- **commit**  Commit all changes made in this session
- **do**  Run commands from Exec mode
- **end**  End current mode and change to EXEC mode
- **exit**  End current mode and down to previous mode
- **help**  Description of the interactive help system
- **revert**  Revert changes
- **service**  Service Commands
- **show**  Show running system information
- **write**  Write running configuration to memory or terminal

```
<DEVICE>(config-bgp-excommunity-list-<EXTCOMMUNITY-LIST-NAME>)#
```

The following table summarizes the BGP extended community list configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>deny</strong></td>
<td>Creates and configures a deny extended community (expanded or standard) rule</td>
<td>page 28-23</td>
</tr>
<tr>
<td><strong>permit</strong></td>
<td>Creates and configures a permit extended community (expanded or standard) rule</td>
<td>page 28-24</td>
</tr>
<tr>
<td><strong>no</strong></td>
<td>Removes an existing deny or permit extended community rule from this extcommunity list</td>
<td>page 28-26</td>
</tr>
</tbody>
</table>

---

Table 28.5  BGP-Extcommunity-List-Config Commands
28.5.1 **deny**

> **bgp-extcommunity-list-config commands**

Creates and configures a deny extended community (expanded or standard) rule

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

deny extcommunity [expanded|standard]

deny extcommunity expanded <LINE>

deny extcommunity standard [rt|soo] <COMMUNITY-NUMBER>

**Parameters**

- **deny extcommunity expanded <LINE>**
  
  Configures a deny expanded named extended community list entry and associates it with a regular expression to match. The regular expression represents the patterns to match in the extended community attributes.
  - `<LINE>` – Provide the regular expression.

- **deny extcommunity standard [rt|soo] <COMMUNITY-NUMBER>**
  
  Configures a deny standard named extended community list entry. and associates it with the target or origin community attributes.
  - `rt` – Configures the route target (RT) extended community attribute
  - `soo` – Configures the site-of-origin (SOO) extended community attribute
  - `<COMMUNITY-NUMBER>` – Specify the community number in one of the following formats: `AA:NN` or `A.B.C.D:NN`

**Examples**

```
nx9500-6C8809(config-bgp-extcommunity-list-test)#deny extcommunity standard rt 200:12

nx9500-6C8809(config-bgp-extcommunity-list-test)#show context
bgp extcommunity-list test
  deny extcommunity standard rt 200:12

nx9500-6C8809(config-bgp-extcommunity-list-test)#

nx9500-6C8809(config)#show context
  !
  ! Configuration of NX9500 version 5.8.4.0-008D
  !
  ! version 2.5

  !
  !---------------------------------------------------------------------

  ! bgp community-list test1
  ! permit community standard no-export

  !
  bgp extcommunity-list test
  deny extcommunity standard rt 200:12

  !
  --More--

nx9500-6C8809(config)#
```

**Related Commands**

- **no**
  
  Removes the specified deny extended community rule from this extcommunity list
28.5.2 permit

`bgp-extcommunity-list-config commands`

Creates and configures a permit extended community (expanded or standard) rule.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

permit extcommunity [expanded|standard]

permit extcommunity expanded <LINE>

permit extcommunity standard [rt|soo] <COMMUNITY-NUMBER>

**Parameters**

- **permit extcommunity expanded <LINE>**
  
  Configures a permit expanded named extended community list entry and associates it with a regular expression to match. The regular expression represents the patterns to match in the extended community attributes.
  
  - <LINE> – Provide the regular expression.

- **permit extcommunity standard [rt|soo] <COMMUNITY-NUMBER>**
  
  Configures a permit standard named extended community list entry and associates it with the target or origin community attributes.
  
  - rt – Configures the RT extended community attribute
  - soo – Configures the SOO extended community attribute
  - <COMMUNITY-NUMBER> – Specify the community number in one of the following formats: AA:NN or A.B.C.D:NN

**Examples**

```
nx9500-6C8809(config-bgp-extcommunity-list-test)#permit extcommunity standard rt 192.168.13.13:12

nx9500-6C8809(config-bgp-extcommunity-list-test)#show context
bgp extcommunity-list test
  permit extcommunity standard rt 192.168.13.13:12
  deny extcommunity standard rt 200:12

nx9500-6C8809(config-bgp-extcommunity-list-test)#
```

```
nx9500-6C8809(config)#show context
!
! Configuration of NX9500 version 5.8.4.0-008D
!
!
version 2.5
!
..........................................................
!
bgp community-list test1
  permit community standard no-export
!
bgp extcommunity-list test
  permit extcommunity standard rt 192.168.13.13:12
  deny extcommunity standard rt 200:12
!
--More--
nx9500-6C8809(config)#
```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the specified permit extended community rule from this extcommunity list</td>
</tr>
</tbody>
</table>
28.5.3 no

- bgp-extcommunity-list-config commands

Removes an existing deny or permit extended community rule from this extcommunity list

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax
no [deny|permit] extcommunity expanded <LINE>
no [deny|permit] extcommunity standard [rt|soo] <COMMUNITY-NUMBER>

Parameters
- no <PARAMETERS>

| no <PARAMETERS> | Removes a deny or permit expanded extended community rule from this community list |

Examples
The following example shows the extended community 'test' settings before the 'no' command is executed:

nx9500-6C8809(config-bgp-extcommunity-list-test)#show context
bgp extcommunity-list test
permit extcommunity standard rt 192.168.13.13:12
deny extcommunity standard rt 200:12
nx9500-6C8809(config-bgp-extcommunity-list-test)#

nx9500-6C8809(config-bgp-extcommunity-list-test)#no permit extcommunity standard 192.168.13.13:12

The following example shows the extended community 'test' settings after the 'no' command is executed:

nx9500-6C8809(config-bgp-extcommunity-list-test)#show context
bgp extcommunity-list test
deny extcommunity standard rt 200:12
nx9500-6C8809(config-bgp-extcommunity-list-test)#
28.6 bgp-route-map-config commands

BORDER GATEWAY PROTOCOL

BGP route maps are used to control and modify routing information. A BGP route map is a collection of deny and/or permit route rules that define and control redistribution of routes between routers and routing processes. Each rule consists of match criteria and set lines. If a route matches a criteria, the corresponding set line is applied, and the route is passed to the BGP table or to the neighbor, depending on whether the route map is set for incoming or outgoing route updates.

Use the (config) instance to configure BGP route map related parameters.

To navigate to this instance, use the following command:

<DEVICE>(config)#route-map <ROUTE-MAP-NAME>

<DEVICE>(config)#route-map test
<DEVICE>(config-dr-route-map-test)#?

Route Map Mode commands:
  deny     Add a deny route map rule to deny set operations
  no       Negate a command or set its defaults
  permit   Add a permit route map rule to permit set operations
  clrscr   Clears the display screen
  commit   Commit all changes made in this session
  do       Run commands from Exec mode
  end      End current mode and change to EXEC mode
  exit     End current mode and down to previous mode
  help     Description of the interactive help system
  revert   Revert changes
  service  Service Commands
  show     Show running system information
  write    Write running configuration to memory or terminal

<DEVICE>(config-dr-route-map-test)#

In the route-map configuration mode, use the following commands to create and configure a deny or permit route map rule:

<DEVICE>(config-dr-route-map-test)#deny route-map <1-65535>
<DEVICE>(config-dr-route-map-test)#permit route-map <1-65535>

For example:

<DEVICE>(config-dr-route-map-test)#deny route-map 1
<DEVICE>(config-dr-route-map-test)#permit route-map 2

<DEVICE>(config-dr-route-map-test)#show context
  route-map test
  permit route-map 1
  deny route-map 2
<DEVICE>(config-dr-route-map-test)#

<DEVICE>(config-dr-route-map-test-dr-route-map-rule-1)#?

Route Map Rule Mode commands:
  description  Configure comment for this route map
  match        Match values from routing table
  no           Negate a command or set its defaults
  set          Set values in destination routing protocol
  clrscr       Clears the display screen
  commit       Commit all changes made in this session
  do           Run commands from Exec mode
  end          End current mode and change to EXEC mode
  exit         End current mode and down to previous mode
  help         Description of the interactive help system
  revert       Revert changes
  service      Service Commands
  show         Show running system information
  write        Write running configuration to memory or terminal
The following table summarizes BGP deny/permit route map rules configuration mode commands:

**Table 28.6 BGP-Route-Map-Config-Mode Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>description</code></td>
<td>Configures a description for this route-map rule (deny or permit) that uniquely distinguishes it from others with similar access permissions</td>
<td>page 28-29</td>
</tr>
<tr>
<td><code>match</code></td>
<td>Configures the match criteria associated with this deny or permit BGP route map</td>
<td>page 28-30</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Removes or reverts the settings defined for a deny or permit route-map rule</td>
<td>page 28-33</td>
</tr>
<tr>
<td><code>set</code></td>
<td>Configures the values attributed to a route matching the match criteria specified in the BGP deny or permit route-map rules</td>
<td>page 28-34</td>
</tr>
</tbody>
</table>
28.6.1 description

- bgp-route-map-config commands

Configures a description for this route map rule (deny or permit) that uniquely distinguishes it from others with similar access permissions.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax

description <LINE>

Parameters

- description <LINE>

| description <LINE> | Provide a description for the route map rule (should not exceed 64 characters in length) |

Examples

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#description "This is a deny route map rule"

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#show context
deny route-map 1
description "This is a deny route map rule"
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#

Related Commands

- no
  Removes this deny/permit route-map rule’s description
### 28.6.2 match

**bpg-route-map-config commands**

Configures the match criteria associated with this deny or permit BGP route map

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
match [as-path|community|extcommunity|ip-address|ip-next-hop|ip-route-source|metric|origin|tag]
match [as-path <AS-PATH-LIST-NAME>|community <COMMUNITY-LIST-NAME> {exact-match}]|
    extcommunity <EXTCOMMUNITY-LIST-NAME>]
match [ip-address|ip-next-hop|ip-route-source] [BGP-IP-ACCESS-LIST <BGP-ACL-NAME>|
    prefix-list <PREFIX-LIST-NAME>]
match metric <0-4294967295>
match origin [egp|igp|incomplete]
match tag <0-65535>
```

**Parameters**

- `match [as-path <AS-PATH-LIST-NAME>|community <COMMUNITY-LIST-NAME> {exact-match}]` | Configures a BGP AS path list to match
  - `<AS-PATH-LIST-NAME>` – Specify the AS path list name (should be existing and configured).
- `match [community <COMMUNITY-LIST-NAME> {exact-match}]` | Configures the AS community list string to match
  - `<COMMUNITY-LIST-NAME>` – Specify the AS community list name (should be existing and configured).
  - `exact-match` – Optional. Does an exact match when matching the specified AS community string. This option is disabled by default.
- `match [extcommunity <EXTCOMMUNITY-LIST-NAME>]` | Configures the external community list string to match
  - `<EXTCOMMUNITY-LIST-NAME>` – Specify the external community list name (should be existing and configured).

- `match [ip-address|ip-next-hop|ip-route-source] [BGP-IP-ACCESS-LIST <BGP-ACL-NAME>|
    prefix-list <PREFIX-LIST-NAME>]` | Configures match criteria used to filter BGP routes when forwarding packets
  - `<BGP-IP-ACCESS-LIST <BGP-ACL-NAME>>` – Associates an existing BGP ACL with this BGP route map. Specify the BGP ACL name (should be existing and configured).
  - `<prefix-list <PREFIX-LIST-NAME>>` – Associates an existing IP address prefix list with this BGP route map. The IP Address Prefix List is a list of prefixes in the route used to filter route. Specify the prefix list name (should be existing and configured).
### ip-next-hop

**[BGP-IP-ACCESS-LIST <BGP-ACL-NAME>][prefix-list <PREFIX-LIST-NAME>]**

Configures the next-hop's IP address to match

The *IP Next Hop* is a list of IP addresses used to filter routes based on the IP address of the next-hop in the route. Use one of the following options to provide next-hop's IP addresses:

- **BGP-IP-ACCESS-LIST <BGP-ACL-NAME>** – Associates an existing BGP ACL with this BGP route map. Specify the BGP ACL name (should be existing and configured).
- **prefix-list <PREFIX-LIST-NAME>** – Associates an existing IP next-hop prefix list with this BGP route map. The *IP Next Hop Prefix List* is a list of prefixes for the route's next-hop determining how the route is filtered. Specify the prefix list name (should be existing and configured).

### ip-route-source

**[BGP-IP-ACCESS-LIST <BGP-ACL-NAME>][prefix-list <PREFIX-LIST-NAME>]**

Configures the advertised route source IP address to match

The *IP Route Source* is a list of IP addresses used to filter routes based on the advertised IP address of the source. Use one of the following options to provide route-source IP addresses:

- **BGP-IP-ACCESS-LIST <BGP-ACL-NAME>** – Associates an existing BGP ACL with this BGP route map. Specify the BGP ACL name (should be existing and configured).
- **prefix-list <PREFIX-LIST-NAME>** – Associates an existing IP route source prefix list with this BGP route map. The *IP Route Source Prefix List* is a list of prefixes used to filter routes based on the prefix list used for the source. Specify the prefix list name (should be existing and configured).

### match metric <0-4294967295>

Defines the exterior metric, used for route map distribution, to match

BGP uses a route table managed by the external metric defined. Setting a metric provides a dynamic way to load balance between routes of equal cost.

- **<0-4294967295>** – Specify the external metric value from 0 - 4294967295.

### match origin [egp|igp|incomplete]

Configures the source of the BGP route to match. Options include:

- **egp** – Matches if the origin of the route is from the *exterior gateway protocol* (eBGP). eBGP exchanges routing table information between hosts outside an autonomous system.
- **igp** – Matches if the origin of the route is from the *interior gateway protocol* (iBGP). iBGP exchanges routing table information between routers within an autonomous system.
- **incomplete** – Matches if the origin of the route is not identifiable.

### match tag <0-65535>

 Configures the BGP route tag to match

The *Tag* is a way to preserve a route's AS path information for routers in iBGP. This option is disabled by default.

- **<0-65535>** – Specify the iBGP route's tag from 0 - 65535.
Examples
The following examples show the configuration of match criteria for the deny route-map rule 1:

```
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#match as-path FilterList_01
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#match ip-route-source prefix-list PrefixList_01
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#show context
deny route-map 1
description "This is a deny route map rule"
  match as-path FilterList_01
  match ip-route-source prefix-list PrefixList_01
```

A permit route-map rule 2 is added to the BGP route-map "test".
```
nx9500-6C8809(config-dr-route-map-test)#permit route-map 2
```

A match criteria is added for the permit route-map rule 2.
```
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-2)#match ip-next-hop DL_01
```

The following example displays the BGP route-map "test" settings:
```
nx9500-6C8809(config-dr-route-map-test)#show context
route-map
deny route-map 1
description "This is a deny route map rule"
  match as-path FilterList_01
  match ip-route-source prefix-list PrefixList_01
permit route-map 2
  match ip-next-hop DL_01
```

Related Commands

```
no
```
Removes match criteria associated with a deny or permit route-map rule
28.6.3 no

- **bgp-route-map-config commands**

Removes or reverts the settings defined for a deny or permit route-map rule

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
no [description|match <PARAMETERS>|set <PARAMETERS>]
```

**Parameters**

- no <PARAMETERS>

**Examples**

The following example shows the ‘deny route-map rule-1’ settings before the ‘no’ commands are executed:

```
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#show context
deny route-map 1
  description "This is a deny route map rule"
mach as-path FilterList_01
  match ip-route-source prefix-list PrefixList_01
  set aggregator-as 1 192.168.13.7
  set as-path exclude 20
  set ip next-hop peer-address
  set metric 300
  set local-preference 30
  set community internet
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#
```

The following example shows the ‘deny route-map rule-1’ settings after the ‘no’ commands are executed:

```
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#no match as-path
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#no set aggregator-as
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#no set metric
```

The following example shows the route-map ‘test’ settings:

```
nx9500-6C8809(config-dr-route-map-test)#show context
route-map test
deny route-map 1
  description "This is a deny route map rule"
mach ip-route-source prefix-list PrefixList_01
  set as-path exclude 20
  set ip next-hop peer-address
  set local-preference 30
  set community internet
permit route-map 2
  match ip-next-hop DL_01
nx9500-6C8809(config-dr-route-map-test)#
```
28.6.4 set

**bgp-route-map-config commands**

Configures the values attributed to a route matching the match criteria specified in the BGP deny or permit route-map rules. These attributes are applied before the route is sent out.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
set [aggregator-as|as-path|atomic-aggregate|comm-list|community|extcommunity|ip|
    local-preference|metric|origin|originator-id|source-ip|tag|weight]

set aggregator-as <1-4294967295> <IP>
set as-path [exclude|prepend] <1-4294967295> {<1-4294967295>}
set atomic-aggregate
set comm-list delete <COMMUNITY-LIST-NAME>
set community [<COMMUNITY-NUMBER>|none]
set extcommunity [rt|soo] <EXTCOMMUNITY-NUMBER>
set ip next-hop [<IP>|peer-address]
set local-preference <0-4294967295>
set metric <0-4294967295>
set origin [egp|igp|incomplete]
set originatorid <IP>
set source-ip <IP>
set tag <0-65535>
set weight <0-4294967295>
```

**Parameters**

- **set aggregator-as <1-4294967295> <IP>**

  Configures the BGP aggregator’s ASN and IP address. Aggregates minimize the size of routing tables. Aggregation combines the characteristics of multiple routes and advertises them as a single route. The configured BGP aggregator settings are applied to filtered routes.
  - `<1-4294967295>` — Specify the route aggregator’s ASN from 1 - 4294967295. This option is disabled by default.
  - `<IP>` — Specify the route aggregator’s IP address. BGP allows the aggregation of specific routes into one route using an aggregate IP address.
### set as-path [exclude|prepend] <1-4294967295> {<1-4294967295>}

| **set as-path [exclude|prepend] <1-4294967295> {<1-4294967295>}** | Configures the BGP transform AS path attribute to be applied to filtered routes  
|---|---|
| • exclude – Configures a single AS, or a list of ASs, excluded from the AS path  
| • prepend – Configures a single AS, or a list of ASs, prepended to the AS path  
| • <1-4294967295> – This keyword is common to the ‘exclude’ and ‘prepend’ parameters. Use it to specify the AS number. The ASs identified here are excluded or prepended depending on the option selected.  
| **Note:** You can configure multiple ASNs. |

### set atomic-aggregate

| **set atomic-aggregate** | Enables BGP atomic aggregate attributes  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>When a BGP enabled wireless controller or service platform receives a set of overlapping routes from a peer, or if the set of routes selects a less specific route, then the local device must set this value when propagating the route to its neighbors. This option is disabled by default.</td>
<td></td>
</tr>
</tbody>
</table>

### set comm-list delete <COMMUNITY-LIST-NAME>

| **set comm-list delete <COMMUNITY-LIST-NAME>** | Deletes specified BGP communities. All communities matching the community list name string are deleted from the route.  
|---|---|
| A BGP community is a group of routes sharing a common attribute.  
| • <COMMUNITY-LIST-NAME> – Specify the community list name. |

### set community [<COMMUNITY-NUMBER>|none]

| **set community [<COMMUNITY-NUMBER>|none]** | Configures a community attribute for this route  
|---|---|
| • <COMMUNITY-NUMBER> – Specify a community attribute. Use one of the following formats:  
| • internet - Advertises this route to the Internet. This is a global community.  
| • local-AS - Prevents the transmit of packets outside the local AS  
| • no-advertise - Prevents advertisement of this route to any peer, either internal or external  
| • no-export - Prevents advertisement of this route to BGP peers, keeping this route within an AS.  
| • aa:nn - Configures the first part (aa) representing the AS number. The second part (nn) represents a 2-byte number.  
| • none – Specifies community attribute as none |

### set extcommunity [rt|soo] <EXTCOMMUNITY-NUMBER>

| **set extcommunity [rt|soo] <EXTCOMMUNITY-NUMBER>** | Configures an extended community attribute for this route  
|---|---|
| • rt – Identifies the route target (rt) extended community  
| • soo – Identifies the site-of-origin (soo) community. This is the origin community associated with the route reflector.  
| • <EXTCOMMUNITY-NUMBER> – This keyword is common to the ‘rt’ and ‘soo’ parameters. Use it to specify the extended community number. |
- **set ip next-hop [<IP>|peer-address]**

  | set ip next-hop [<IP>|peer-address] |
  |-------------------------------------|
  | Configures the next hop for this route. Use one of the following options to identify the next hop: |
  | • <IP> – Specify the next hop's IP address |
  | • peer-address – Enables the identification of the next-hop address for peer devices. This option is disabled by default |

- **set local-preference <0-4294967295>**

<table>
<thead>
<tr>
<th>set local-preference &lt;0-4294967295&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures the BGP local preference path attribute for this route map. When configured, enables the communication of preferred routes out of the AS between peers. This option is disabled by default</td>
</tr>
<tr>
<td>• &lt;0-4294967295&gt; – Specify the preference value from 0 - 4294967295.</td>
</tr>
</tbody>
</table>

- **set metric <0-4294967295>**

<table>
<thead>
<tr>
<th>set metric &lt;0-4294967295&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures a metric for the route</td>
</tr>
<tr>
<td>BGP uses a route table managed by the external metric defined. Setting a metric provides a dynamic way to load balance between routes of equal cost.</td>
</tr>
<tr>
<td>• &lt;0-4294967295&gt; – Specify the metric from 0 - 4294967295.</td>
</tr>
</tbody>
</table>

- **set origin [egp|igp|incomplete]**

  | set origin [egp|igp|incomplete] |
  |----------------------------------|
  | Configures the origin code for this BGP route map |
  | • egp - Sets the origin of the route to eBGP |
  | • igp - Sets the origin of the route to iBGP |
  | • incomplete - Sets the origin of the route as not identifiable. Use this option if the route is from a source other than eBGP or iBGP. |

- **set originatorid <IP>**

<table>
<thead>
<tr>
<th>set originatorid &lt;IP&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures this route map's originator IP address</td>
</tr>
</tbody>
</table>

- **set source-ip <IP>**

<table>
<thead>
<tr>
<th>set source-ip &lt;IP&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures this route map's source IP address</td>
</tr>
<tr>
<td>• &lt;IP&gt; – Specify the IP address in the A.B.C.D format.</td>
</tr>
</tbody>
</table>

- **set tag <0-65535>**

<table>
<thead>
<tr>
<th>set tag &lt;0-65535&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures this route map's tag value</td>
</tr>
<tr>
<td>The Tag is a way to preserve a route's AS path information for routers in iBGP.</td>
</tr>
<tr>
<td>• &lt;0-65535&gt; – Specify a tag value from 0 - 65535.</td>
</tr>
</tbody>
</table>

- **set weight <0-4294967295>**

<table>
<thead>
<tr>
<th>set weight &lt;0-4294967295&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables assignment of a weighted priority to the aggregate route</td>
</tr>
<tr>
<td>• &lt;0-4292967295&gt; – Specify a value from 0 - 4294967295.</td>
</tr>
</tbody>
</table>
Examples

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#set aggregator-as 1 192.168.13.7

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#set as-path exclude 20

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#set community internet

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#set ip next-hop peer-address

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#set local-preference 30

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#set metric 300

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#show context deny route-map 1
   description "This is a deny route map rule"
   match as-path FilterList_01
   match ip-route-source prefix-list PrefixList_01
   set aggregator-as 1 192.168.13.7
   set as-path exclude 20
   set ip next-hop peer-address
   set metric 300
   set local-preference 30
   set community internet

Related Commands

<table>
<thead>
<tr>
<th>no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removes the attributes configured for this route map</td>
</tr>
</tbody>
</table>
28.7 bgp-router-config commands

- **BORDER GATEWAY PROTOCOL**

Use the (device-config) or (profile-config) instance to configure BGP router related parameters.

To navigate to the BGP router configuration instance, in the device-config mode, use the following commands:

<DEVICE>(config)#self
<DEVICE>(config-device-<MAC>)#router bgp
<DEVICE>config-device <MAC>-router-bgp)#

<DEVICE>config-device <MAC>-router-bgp)#?

Router BGP Mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aggregate-address</td>
<td>Configure aggregate address</td>
</tr>
<tr>
<td>asn</td>
<td>Configure local Autonomous System Number</td>
</tr>
<tr>
<td>bgp</td>
<td>Border Gateway Protocol</td>
</tr>
<tr>
<td>bgp-route-limit</td>
<td>Limit for number of routes handled by BGP process</td>
</tr>
<tr>
<td>distance</td>
<td>Configure administrative distance</td>
</tr>
<tr>
<td>ip</td>
<td>Internet Protocol (IP)</td>
</tr>
<tr>
<td>network</td>
<td>Configure a local network</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>route-redistribute</td>
<td>Redistribute information from another routing protocol</td>
</tr>
<tr>
<td>timers</td>
<td>Adjust routing timers</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
</tr>
</tbody>
</table>

<DEVICE>config-device <MAC>-router-bgp)#

When configured as a profile, the router settings are applied to all devices using the profile.

To navigate to the BGP router configuration instance, in the profile-config mode, use the following commands:

<DEVICE>(config)#profile <DEVICE-TYPE> <PROFILE-NAME>

<DEVICE>(config-profile-<PROFILE-NAME>)#router bgp
<DEVICE>(config-profile <PROFILE-NAME>-router-bgp)#

<DEVICE>(config-profile <PROFILE-NAME>-router-bgp)#?

Router BGP Mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aggregate-address</td>
<td>Configure aggregate address</td>
</tr>
<tr>
<td>asn</td>
<td>Configure local Autonomous System Number</td>
</tr>
<tr>
<td>bgp</td>
<td>Border Gateway Protocol</td>
</tr>
<tr>
<td>bgp-route-limit</td>
<td>Limit for number of routes handled by BGP process</td>
</tr>
<tr>
<td>distance</td>
<td>Configure administrative distance</td>
</tr>
<tr>
<td>ip</td>
<td>Internet Protocol (IP)</td>
</tr>
<tr>
<td>network</td>
<td>Configure a local network</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>route-redistribute</td>
<td>Redistribute information from another routing protocol</td>
</tr>
<tr>
<td>timers</td>
<td>Adjust routing timers</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
</tr>
<tr>
<td>exit</td>
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<tr>
<td>help</td>
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<tr>
<td>service</td>
<td>Service Commands</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
</tr>
</tbody>
</table>
The following table summarizes BGP router configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>aggregate-address</td>
<td>Creates and configures an aggregate address entry in the BGP database</td>
<td>page 28-40</td>
</tr>
<tr>
<td>asn</td>
<td>Configures this BGP router’s ASN</td>
<td>page 28-41</td>
</tr>
<tr>
<td>bgp</td>
<td>Configures BGP router parameters</td>
<td>page 28-42</td>
</tr>
<tr>
<td>bgp-route-limit</td>
<td>Configures the BGP route limit parameters</td>
<td>page 28-46</td>
</tr>
<tr>
<td>distance</td>
<td>Configures administrative distance parameters</td>
<td>page 28-47</td>
</tr>
<tr>
<td>ip</td>
<td>Configures the BGP default gateway’s priority</td>
<td>page 28-48</td>
</tr>
<tr>
<td>network</td>
<td>Configures the local network IP addresses and masks</td>
<td>page 28-49</td>
</tr>
<tr>
<td>no</td>
<td>Removes the BGP router settings</td>
<td>page 28-50</td>
</tr>
<tr>
<td>route-redistribute</td>
<td>Enables redistribution of routes learnt from other routing protocols into BGP</td>
<td>page 28-51</td>
</tr>
<tr>
<td>timers</td>
<td>Enables adjustment of keepalive and holdtime intervals</td>
<td>page 28-53</td>
</tr>
</tbody>
</table>
28.7.1 **aggregate-address**

*bgp-router-config commands*

Creates and configures an aggregate address entry in the BGP database

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
aggregate-address <IP/M> {as-set {summary-only}|summary-only}
```

**Parameters**

- `aggregate-address <IP/M>`
- `{as-set {summary-only}|summary-only}`

<table>
<thead>
<tr>
<th><code>aggregate-address &lt;IP/M&gt;</code></th>
<th>Specify the aggregate IP address and mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>`{as-set {summary-only}</td>
<td>summary-only}`</td>
</tr>
<tr>
<td><code>summary-only</code></td>
<td>• summary-only – Optional. Filters more specific routes from updates</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#aggregate-address
192.168.13.10/32 as-set summary-only

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#show context
router bgp
bgp enable
asn 1
aggregate-address 192.168.13.10/32 as-set summary-only
  bgp neighbor 192.168.13.199
  remote-as 1
  use route-map UnSupMap_01 in
  bgp neighbor 192.168.13.99
  remote-as 199
  timers connect 10
  timers 20 40
  maximum-prefix 9999 80 restart 50
  bgp neighbor 1.1.1.1
  remote-as 2
  timers connect 10
  timers 20 40
  maximum-prefix 1000000
  bgp-route-limit num-routes 10 reset-time 360

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#
```

**Related Commands**

```
no
```

Removes the aggregate address entry
28.7.2 `asn`

**bgp-router-config commands**

Configures the ASN. The ASN represents a group of routers under the same administration and using IGP and common metrics to define how to route packets. In short the ASN represents all routers within an AS.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
asn <1-4294967295>
```

**Parameters**

- `asn <1-4294967295>`

<table>
<thead>
<tr>
<th><code>asn &lt;1-4294967295&gt;</code></th>
<th>Specify the ASN from 1 - 4294967295.</th>
</tr>
</thead>
</table>

**Examples**

```
nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#asn 1

nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#show context router bgp
  asn 1

nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#
```
# 28.7.3 bgp

**bgp-router-config commands**

Configures BGP router parameters

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
bgp [always-compare-med|bestpath|client-to-client|cluster-id|confederation|dampening|default|deterministic-med|enable|enforce-first-as|fast-external-failover|graceful-restart|log-neighbor-changes|neighbor|network|router-id|scan-time]
bgp [always-compare-med|deterministic-med|enable|enforce-first-as|fast-external-failover|log-neighbor-changes]
bgp best-path [as-path [confed|ignore]|compare-router-id|med\{confed {missing-as-worst}|missing-as-worst\]}
bgp client-to-client reflection
bgp cluster <IP>
bgp confederation [identifier|peers] <1-4294967295>
bgp dampening {<1-45>} {<1-20000>} <1-20000> <1-255>
bgp default [ipv4-unicast|local-preference <0-4294967295>]
bgp graceful-restart [stalepath-time <1-3600>]
bgp neighbor <IP>
bgp network import-check
bgp router-id <IP>
bgp scan-time <5-60>
```

**Parameters**

- **always-compare-med**
  
  Enables comparison of *Multi-exit Discriminators* (MEDs) received from neighbors. This option is disabled by default.
  
  MED is a value used by BGP peers to select the best route among multiple routes. When enabled, the MED value encoded in the route is always compared when selecting the best route to the host network. A route with a lower MED value is preferred over a route with a higher MED value. BGP does not discriminate between iBGP and eBGP when using MED for route selection. This option is mutually exclusive to the `deterministic-med` option.

- **deterministic-med**
  
  Enables selection of the best MED path from amongst all paths advertised by neighboring ASs. This option is disabled by default.
  
  MED is used by BGP peers to select the best route among multiple routes. When enabled, MED route values (from the same AS) are compared to select the best route. This best route is then compared with other routes in the BGP route table to select the best overall route. This option is mutually exclusive to the `always-compare-med` option.

- **enable**
  
  Starts the BGP daemon on the device (wireless controller or service platform). BGP is disabled by default.

- **enforce-first-as**
  
  Enforces the first AS for all BGP routes. This option is disabled by default.
  
  When enforced, devices deny updates received from an external neighbor that does not have the neighbor’s configured AS at the beginning of the received AS path parameter. This enhances security by not allowing traffic from an unauthorized AS.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>fast-external-failover</code></td>
<td>Enables immediate resetting of BGP session on the interface once the BGP connection goes down. This option is enabled by default. When enabled, a session is reset as soon as the direct link to an external peer goes down. Normally, when a BGP connection goes down, the device waits for the expiry of the duration specified in <code>holdtime</code> parameter before bringing down the interface. <strong>Note:</strong> To configure the <code>holdtime</code>, use the <code>timers &gt; bgp &gt; &lt;keepalive-time&gt; &gt; &lt;holdtime&gt;</code> command in this (BGP router) configuration mode.</td>
</tr>
<tr>
<td><code>log-neighbor-changes</code></td>
<td>Enables logging of a BGP neighbor’s status change (active or not active) events. It also enables the logging of the reason for such change in status.</td>
</tr>
</tbody>
</table>
| `as-path [confed|ignore]` | Enables an AS path from being considered as a criteria for selecting the preferred route  
  • `confed` – Enables comparison of path lengths (including confederation sets and sequences) when selecting a route (EXPERIMENTAL). This option is disabled by default.  
  • `ignore` – Disables an AS path length from being considered as a criteria for selecting a preferred route. When, disabled the AS path length is ignored. This option is disabled by default.  |
| `compare-router-id` | Enables the use of router ID as a selection criteria when selecting the preferred route. When enabled, the router ID is used to select the best path between two identical BGP routes. The route with the lower router ID is selected over a route with a higher router ID. This option is disabled by default. |
| `med {confed {missing-as-worst}|missing-as-worst]` | Enables comparison of AS path MED value when selecting the preferred route. MED is a value used by BGP peers to select the best route among multiple routes. When enabled, the MED value encoded in the route is always compared to determine the best route to the host network. A route with a lower MED value is preferred over a route with a higher MED value.  
  • `confed` – Optional. Enables comparison of MED value among confederation paths (EXPERIMENTAL). When enabled, you can optionally enable the treatment of AS paths without the MED value as the least preferable route. This option is disabled by default.  
  • `missing-as-worst` – Optional. Enables the treatment of AS paths without the MED value as the least preferable route. This option is disabled by default.  |
| `client-to-client reflection` | Enables client-to-client route reflection (EXPERIMENTAL)  
  Route reflectors are used when all iBGP speakers are not fully meshed. If the clients are fully meshed, the route-reflectors are not required. This option is enabled by default. |
| `cluster <IP>` | Enables and sets a cluster ID, in case the BGP cluster has more than one route-reflector.  
  A cluster generally consists of a single route-reflector and its clients. The cluster is usually identified by the router ID of this single route-reflector. Sometimes, to increase redundancy, a cluster might have more than one route-reflector configured. In this case, all route-reflectors in the cluster are identified by the cluster ID (configured in the IP format). |
- `bgp confederation [identifier|peers] <1-4294967295>`

  Configures AS confederation (group of ASs) parameters (identifier and peers)
  - identifier – Enables and sets a BGP confederation identifier to allow an AS to be
    divided into several ASs. In other words an AS is divided into multiple ASs, and
    together they form a confederation. This confederation is visible to external routers as
    a single AS. The ASN is usually the confederation ID. Specify a value from 1 -
    4294967295.
  - peers – Configures the maximum number of the ASs constituting this BGP
    confederation. Specify the AS number from 1 - 4294967295. Multiple ASs can be
    added to the list of confederation members.

- `bgp dampening {<1-45>} {<1-20000>} <1-20000> <1-255>`

  Enables dampening and configures dampening parameters. This option is disabled by
  default.
  Dampening minimizes the instability caused by route flapping. A penalty is added for
  every flap in the flapping route. As soon as the total penalty reaches the specified `Route
  Suppress Limit` value, the advertisement of this route is suppressed. This penalty is
  delayed when the time specified in `Half Lifetime` occurs. Once the penalty becomes
  lower than the value specified in `Start Route Reuse`, the advertisement of the route is un-
  suppressed.
  - `<1-45>` – Optional. Configures the half lifetime (in minutes). A penalty is imposed on
    a route that flaps. This is the time for the penalty to decrease to half its current value.
    Specify a value from 1 - 45 minutes. The default is 1 minute.
  - `<1-20000>` – Optional. Configures the route reuse value. When the penalty for a
    suppressed route decays below the value specified here, the route is un-suppressed
    (reused). Specify a value from 1 - 20000.
  - `<1-20000>` – Configures the route suppress value. When a route flaps, a penalty is
    added to the route. When the penalty reaches or exceeds the value specified as the
    ‘maximum duration to suppress a stable route’. Specify a value from 1 - 20000.
  - `<1-255>` – Configures the maximum duration, in minutes, a suppressed route is
    suppressed. This is the maximum duration for which a route remains suppressed
    before it is reused. Specify a value from 1 - 255 minutes.

- `bgp default [ipv4-unicast|local-preference <0-4294967295>]`

  Configures the following defaults for BGP neighbor-related parameters: IPv4 unicast
  and local preference

<table>
<thead>
<tr>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipv4-unicast</td>
<td>Enable IPv4 unicast traffic for neighbors. This option is enabled by default.</td>
</tr>
<tr>
<td>local-preference &lt;0-4294967295&gt;</td>
<td>Configures a local preference for the neighbor. Higher the value higher is the preference.</td>
</tr>
<tr>
<td>- <code>&lt;0-4294967295&gt;</code> – Specify a value from 40 - 4294967295.</td>
<td></td>
</tr>
</tbody>
</table>
**BORDER GATEWAY PROTOCOL 28-45**

- **bgp graceful-restart {stalepath-time <1-3600>**

  Enables graceful restart on this BGP router. This option is disabled by default
  - stalepath-time <1-3600> – Optional. Configures the maximum time, in seconds, to retain stale paths from restarting neighbor. This is the time the paths from a restarting neighbor are preserved. All stale paths, unless reinstated by the neighbor after re-establishment, are deleted at the expiry of the time specified here.
  - <1-3600> – Specify a value from 1 - 3600 seconds.

- **bgp neighbor <IP>**

  Configures the BGP neighbor’s IP address and enters its configuration mode. Use this command to configure a BGP neighbor’s parameters.
  - <IP> – Specify the IP address in the A.B.C.D format.
  **Note:** For BGP neighbor configuration parameters, see `bgp-neighbor-config commands`.

- **bgp network import-check**

  Enables checking of the existence of BGP network route in IGP before importing

- **bgp router-id <IP>**

  Enables the device (BGP supported wireless controller or service platform) identified by the <IP> parameter as a router. The router’s IP address is configured as its ID, and uniquely identifies it. When not specified, the IP address of the interface is configured as the router ID. This option is disabled by default.

- **bgp scan-time <5-60>**

  Configures the scanning interval, in seconds, for updating BGP routes. This is the interval between two consecutive scans the BGP device performs in order to validate routes in its routing table. To disable scanning, set the value to Zero (0).
  - <5-60> – Specify a value from 5 - 60 seconds. The default is 60 seconds.

**Examples**

nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#bgp router-id 192.168.13.13

nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#aggregate-address 116.117.118.0/24 as-set summary-only

nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#bgp neighbor 192.168.13.99

nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#show context
router bgp
  aggregate-address 116.117.118.0/24 as-set summary-only
  bgp router-id 192.168.13.13
  bgp neighbor 192.168.13.99
  remote-as 199
  maximum-prefix 9999 80 restart 50

nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#

**Related Commands**

- **no** Removes the BGP router parameters. The `no > bgp > enable` command disabled BGP.
28.7.4 bgp-route-limit

**bgp-router-config commands**

Configures the BGP route limit parameters

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
bgp-route-limit [num-routes <VALUE>|reset-time <1-86400>|retry-count <1-32>|retry-timeout <1-3600>]
```

**Parameters**

- `num-routes <VALUE>`
  - Configures the number of routes that can be stored on this BGP router. Set this value based on the available memory on this BGP router (wireless controller or service platform).
  - `<VALUE>` – Specify a value from 1 - 4,294,967,295. The default is 9216 routes.

- `reset-time <1-86400>`
  - Configures the reset time in seconds. This is the time after which the retry count value is set to Zero (0).
  - `<1-86400>` – Specify a value from 1 - 86,400 seconds. The default is 360 seconds.

- `retry-count <1-32>`
  - Configures the maximum number of times the BGP process is reset before being permanently shut down. Once shut down, the BGP process has to be started manually. The BGP process is reset if it is flooded with route entries that exceed the maximum number of routes configured for this device.
  - `<1-32>` – Specify a value from 1 - 32. The default is 5 routes.

- `retry-timeout <1-3600>`
  - Configures the duration, in seconds, the BGP process is temporarily shut down, before a reset of the process is attempted.
  - `<1-3600>` – Specify a value from 1 - 3600 seconds. The default is 60 seconds.

**Examples**

```
nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#bgp-route-limit num-routes 10

nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#show context router bgp
  bgp enable
  as 1
  aggregate-address 116.117.118.0/24 as-set summary-only
  bgp neighbor 192.168.13.99
  remote-as 199
  maximum-prefix 9999 80 restart 50
  bgp-route-limit num-routes 10

nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#
```

**Related Commands**

- `no`
  - Removes BGP route limitations configured. Use the no command to revert back to default.
28.7.5 distance

- **bgp-router-config commands**
  
  Configures administrative distance parameters. The distance parameter is a rating of the trustworthiness of a route. The higher the distance, lower is the trust rating. The distance can be set for each type of route indicating its trust rating.

  Supported in the following platforms:
  - Wireless Controllers — RFS4000, RFS6000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

- **Syntax**
  
  distance [<IP/M> <1-255> <BGP-ACL-NAME>|bgp <1-255> <1-255> <1-255>]

- **Parameters**
  - distance [<IP/M> <1-255> <BGP-ACL-NAME>|bgp <1-255> <1-255> <1-255>]

- **Examples**
  
  nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#distance bgp 200 100 200

  nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#show context router bgp
gbg enable
asn 1
aggregate-address 116.117.118.0/24 as-set summary-only
distance bgp 200 100 200
bgp neighbor 192.168.13.99
remote-as 199
maximum-prefix 9999 80 restart 50
bgp-route-limit num-routes 10
nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#

- **Related Commands**

  no

  Removes the administrative distance related configurations
28.7.6 **ip**

> **bgp-router-config commands**

Configures the BGP default gateway's priority

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

`ip default-gateway priority <1-8000>`

**Parameters**

- `ip default-gateway priority <1-8000>`

<table>
<thead>
<tr>
<th>default-gateway priority &lt;1-8000&gt;</th>
<th>Configures the default gateway's (acquired through BGP) priority</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;1-8000&gt;</code> – Specify a value from 1 - 8000. The default is 7500.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Lower the value, higher is the priority.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#ip default-gateway priority 1
```

```
nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#show context
router bgp
bgp enable
asn 1
ip default-gateway priority 1
bgp-route-limit num-routes 10
nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#
```

**Related Commands**

| no | Removes the BGP default gateway configuration |
28.7.7 network

**bgp-router-config commands**

Configures the local network IP addresses and masks. These network addresses are broadcasted to neighboring BGP peers. You can configure a single IP address or a range of IP addresses in the A.B.C.D/M notation.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
network <IP/M> {backdoor|pathlimit|route-map}
```

```
network <IP/M> {backdoor pathlimit <1-255>
```

```
network <IP/M> {pathlimit <1-255>}
```

```
network <IP/M> {route-map <ROUTE-MAP-NAME>}
```

**Parameters**

- `network <IP/M> {backdoor pathlimit <1-255>|pathlimit <1-255>|route-map <ROUTE-MAP-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>network &lt;IP/M&gt;</code></td>
<td>Configures the local network’s address in the A.B.C.D/M format</td>
</tr>
<tr>
<td>backdoor</td>
<td>Optional. Configures a BGP backdoor route. After configuring the backdoor route, you can optionally configure the as-path hop count limit attribute for this backdoor route.</td>
</tr>
<tr>
<td>pathlimit &lt;1-255&gt;</td>
<td>Optional. Configures the hop count limit from 1 - 255.</td>
</tr>
<tr>
<td>pathlimit &lt;1-255&gt;</td>
<td>Optional. Configures the maximum path limit for this AS</td>
</tr>
<tr>
<td>route-map &lt;ROUTE-MAP-NAME&gt;</td>
<td>Optional. Associates a BGP route map with this local network. When applied, the route-map values take precedence</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#network 192.168.13.0/24 backdoor pathlimit 200
```

```
nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#show context router bgp
bgp enable
asn 1
aggregate-address 116.117.118.0/24 as-set summary-only
distance bgp 200 100 200
bgp neighbor 192.168.13.99
remote-as 199
maximum-prefix 9999 80 restart 50
network 1.2.3.0/24
network 192.168.13.0/24 backdoor pathlimit 200
bgp-route-limit num-routes 10
nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#
```

**Related Commands**

```
no
```

Removes the list of local networks configured
28.7.8 no

- bgp-router-config commands

Removes the BGP router settings

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax

no [aggregate-address|bgp|bgp-route-limit|distance|ip|network|route-redistribute|timers]

Parameters
- no <PARAMETERS>

Examples

The following example shows the BGP router settings before the 'no' commands have been executed:

```
nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#show context
router bgp
  bgp enable
  asn 1
  aggregate-address 116.117.118.0/24 as-set summary-only
    bgp neighbor 192.168.13.199
    remote-as 1
    use route-map UnSupMap_01 in
  bgp neighbor 192.168.13.99
    remote-as 199
    maximum-prefix 9999 80 restart 50
  bgp-route-limit num-routes 10 reset-time 360
```

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#

```
nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#no bgp neighbor 192.168.13.99
nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#no aggregate-address 116.117.118.0/24
nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#no bgp-route-limit
```

The following example shows the BGP router settings after the 'no' commands have been executed:

```
nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#show context
router bgp
  bgp enable
  asn 1
  bgp neighbor 192.168.13.199
    remote-as 1
    use route-map UnSupMap_01 in
```

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#
### 28.7.9 route-redistribute

**bgp-router-config commands**

Enables redistribution of routes learnt from other routing protocols into BGP.

Large ISP networks using multiple routing protocols, need to enable redistribution of routes across routing protocols. Routing protocols differ in their basic characteristics, such as metrics, administrative distance, classful and classless capabilities, etc. When enabling redistribution, these differences have to be taken into consideration.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
route-redistribute [connected|kernel|ospf|static] { metric <0-4294967295> |
route-map <ROUTE-MAP-NAME> }
```

**Parameters**

- `route-redistribute [connected|kernel|ospf|static] { metric <0-4294967295> |
 route-map <ROUTE-MAP-NAME> }
`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>route-redistribute</strong></td>
<td>Redistributes routes learnt from other protocols</td>
</tr>
<tr>
<td><strong>connected</strong></td>
<td>Redistributes directly connected routes</td>
</tr>
<tr>
<td></td>
<td>• metric &lt;0-4294967295&gt; – Optional. Specify the metric for the redistributed routes.</td>
</tr>
<tr>
<td></td>
<td>• route-map &lt;ROUTE-MAP-NAME&gt; – Optional. Specifies the route map name. The route map defines the match criteria based on which routes are filtered before redistribution. For more information on route maps, see <a href="#">match</a>.</td>
</tr>
<tr>
<td><strong>kernel</strong></td>
<td>Redistributes kernel routes. These are routes that are neither connected, nor static, nor dynamic.</td>
</tr>
<tr>
<td></td>
<td>• metric &lt;0-4294967295&gt; – Optional. Specify the metric for the redistributed routes.</td>
</tr>
<tr>
<td></td>
<td>• route-map &lt;ROUTE-MAP-NAME&gt; – Optional. Specifies the route map name. The route map defines the match criteria based on which routes are filtered before redistribution. For more information on route maps, see <a href="#">match</a>.</td>
</tr>
<tr>
<td><strong>ospf</strong></td>
<td>Redistributes OSPF routes</td>
</tr>
<tr>
<td></td>
<td>• metric &lt;0-4294967295&gt; – Optional. Specify the metric for the redistributed routes.</td>
</tr>
<tr>
<td></td>
<td>• route-map &lt;ROUTE-MAP-NAME&gt; – Optional. Specifies the route map name. The route map defines the match criteria based on which routes are filtered before redistribution. For more information on route maps, see <a href="#">match</a>.</td>
</tr>
<tr>
<td><strong>static</strong></td>
<td>Redistributes static routes</td>
</tr>
<tr>
<td></td>
<td>• metric &lt;0-4294967295&gt; – Optional. Specify the metric for the redistributed routes.</td>
</tr>
<tr>
<td></td>
<td>• route-map &lt;ROUTE-MAP-NAME&gt; – Optional. Specifies the route map name. The route map defines the match criteria based on which routes are filtered before redistribution. For more information on route maps, see <a href="#">match</a>.</td>
</tr>
</tbody>
</table>
Examples

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#route-redistribute connected metric 200

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#show context router bgp
bgp enable
asn 1
aggregate-address 116.117.118.0/24 as-set summary-only
bgp neighbor 192.168.13.99
  remote-as 199
  maximum-prefix 9999 80 restart 50
bgp neighbor 192.168.13.199
  remote-as 1
  use route-map UnSupMap_01 in
route-redistribute connected metric 200
bgp-route-limit num-routes 10 reset-time 360
nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#

Related Commands

no | Disables redistribution of routes learnt from other routing protocols into BGP
28.7.10 timers

- **bgp-router-config commands**

  Enables adjustment of keepalive and holdtime intervals

  Supported in the following platforms:
  - Wireless Controllers — RFS4000, RFS6000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

`timers bgp <0-65535> <0-65535>`

**Parameters**

- `timers bgp <0-65535> <0-65535>`

<table>
<thead>
<tr>
<th>timers bgp</th>
<th>Configures the keepalive and holdtime interval in seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-65535&gt;</td>
<td>&lt;0-65535&gt; – Specify a keepalive interval from 0 - 65535 seconds. It is the interval, in seconds, between two successive keepalive packets exchanged with this router and its neighbor to keep the TCP connection alive.</td>
</tr>
<tr>
<td>&lt;0-65535&gt;</td>
<td>&lt;0-65535&gt; – Specify a holdtime value from 0 - 65535 seconds. This is the time this router will wait without receiving a keepalive packet from its neighbor before declaring it dead. If the time since the last keepalive packet received (from its neighbor) exceeds the value set here, the neighbor is declared dead.</td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#timers bgp 100 100

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#show context router bgp
  bgp enable
  as 1
  aggregate-address 116.117.118.0/24 as-set summary-only
  bgp neighbor 192.168.13.199
  remote-as 1
  use route-map UnSupMap_01 in
  bgp neighbor 192.168.13.99
  remote-as 199
  maximum-prefix 9999 80 restart 50
  timers bgp 100 100
  bgp-route-limit num-routes 10 reset-time 360

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp)#

**Related Commands**

- `no` Reverts BGP timers to default
28.8 bgp-neighbor-config commands

BORDER GATEWAY PROTOCOL

BGP enabled devices connected through an established TCP connection are referred to as BGP peers or neighbors. To establish a TCP connection, BGP routers exchange open messages containing the following information: AS number, BGP version running, BGP router ID, and timer values (keepalive and holdtime). Once these values are accepted by both devices, the connection is established and the routers become neighbors. With the TCP connection established the BGP neighbors begin sharing routing information and updates. A failure in the establishment of the TCP connection indicates that the routers are not neighbors and cannot exchange routing information.

Use the (profile/device-config) instance to configure BGP neighbors.

To navigate to the BGP neighbor configuration instance, use the following commands:

```
<DEVICE>(config)#profile <PROFILE-NAME>
<DEVICE>(config-profile <PROFILE-NAME>)#router bgp
<DEVICE>(config-profile <PROFILE-NAME>-router-bgp)#?
<DEVICE>(config-profile <PROFILE-NAME>-router-bgp)#bgp neighbor ?
A.B.C.D  IP address of the bgp neighbor
<DEVICE>(config-profile <PROFILE-NAME>-router-bgp)#
<DEVICE>(config-profile <PROFILE-NAME>-router-bgp)#bgp neighbor <IP>
<DEVICE>(config-profile <PROFILE-NAME>-router--bgp-neighbor-<IP>)#?
```

Router BGP Neighbor Mode commands:

- **activate**: Enable the Address Family for this Neighbor
- **advertisement-interval**: Minimum interval between BGP routing updates
- **allowas-in**: Accept as-path with my AS present in it
- **attribute-unchanged**: BGP attribute is propagated unchanged to this neighbor
- **capability**: Advertise capability to the peer
- **default-originate**: Originate default route to this neighbor
- **description**: Neighbor specific description
- **disable-connected-check**: One-hop away EBGP peer using loopback address
- **dont-capability-negotiate**: Do not perform capability negotiation
- **ebgp-multihop**: Allow EBGP neighbors not on directly connected networks
- **enforce-multihop**: Enforce EBGP neighbors perform multihop
- **local-as**: Specify a local-as number
- **maximum-prefix**: Maximum number of prefix accept from this peer
- **next-hop-self**: Disable the next hop calculation for this neighbor
- **no**: Negate a command or set its defaults
- **override-capability**: Override capability negotiation result
- **passive**: Don't send open messages to this neighbor
- **password**: Set a password
- **peer-group**: Set peer-group for this neighbor
- **port**: Neighbor's BGP port
- **remote-as**: Specify a BGP neighbor
- **remove-private-as**: Remove private AS number from outbound updates
- **route-server-client**: Configure a neighbor as Route Server client
- **send-community**: Send Community attribute to this neighbor
- **shutdown**: Administratively shut down this neighbor
- **soft-reconfiguration**: Per neighbor soft reconfiguration
- **strict-capability-match**: Strict capability negotiation match
- **timers**: BGP per neighbor timers
unsuppress-map | Route-map to selectively unsuppress suppressed routes
update-source | Source of routing updates
use | Set setting to use
weight | Set default weight for routes from this neighbor
clrscr | Clears the display screen
commit | Commit all changes made in this session
do | Run commands from Exec mode
end | End current mode and change to EXEC mode
exit | End current mode and down to previous mode
help | Description of the interactive help system
revert | Revert changes
service | Service Commands
show | Show running system information
write | Write running configuration to memory or terminal

<DEVICE>(config-profile <PROFILE-NAME>-router--bgp-neighbor-</IP>)#

The following table summarizes BGP deny/permit route map rules configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>activate</td>
<td>Enables an address family for this neighbor (EXPERIMENTAL)</td>
<td>page 28-57</td>
</tr>
<tr>
<td>advertisement-interval</td>
<td>Configures the minimum interval between two consecutive BGP router updates</td>
<td>page 28-58</td>
</tr>
<tr>
<td>allowas-in</td>
<td>Enables re-advertisement of all prefixes containing duplicate ASNs (EXPERIMENTAL)</td>
<td>page 28-59</td>
</tr>
<tr>
<td>attribute-unchanged</td>
<td>Enables the propagation of BGP attribute values unchanged to this neighbor BGP device (EXPERIMENTAL)</td>
<td>page 28-60</td>
</tr>
<tr>
<td>capability</td>
<td>Enables the advertisement of capability (dynamic and ORF) to BGP peers</td>
<td>page 28-61</td>
</tr>
<tr>
<td>default-originate</td>
<td>Enables the sending of the default route to BGP neighbors. It also allows the configuration of the default route.</td>
<td>page 28-62</td>
</tr>
<tr>
<td>description</td>
<td>Configures a description for a BGP neighbor device</td>
<td>page 28-63</td>
</tr>
<tr>
<td>disable-connected-check</td>
<td>Enables one-hop away EBGP peer using loop back address (EXPERIMENTAL)</td>
<td>page 28-64</td>
</tr>
<tr>
<td>dont-capability-negotiate</td>
<td>Disables capability negotiation with BGP neighbors (EXPERIMENTAL)</td>
<td>page 28-65</td>
</tr>
<tr>
<td>ebgp-multihop</td>
<td>Enables eBGP Multihop on this BGP neighbor, and configures the maximum number of hops that can be between eBGP neighbors not directly connected to each other.</td>
<td>page 28-66</td>
</tr>
<tr>
<td>enforce-multihop</td>
<td>Forces EBGP neighbors to perform multi-hop checks (EXPERIMENTAL)</td>
<td>page 28-67</td>
</tr>
<tr>
<td>local-as</td>
<td>Configures this neighbor’s local AS number. Also enables the prepending of this AS number in route updates. (EXPERIMENTAL)</td>
<td>page 28-68</td>
</tr>
<tr>
<td>maximum-prefix</td>
<td>Configures the maximum number of prefixes that can be received from a BGP neighbor</td>
<td>page 28-69</td>
</tr>
<tr>
<td>next-hop-self</td>
<td>Enables next-hop calculation for this neighbor</td>
<td>page 28-70</td>
</tr>
<tr>
<td>no</td>
<td>Removes this BGP neighbor’s settings, or reverts them back to default</td>
<td>page 28-71</td>
</tr>
<tr>
<td>override-capability</td>
<td>Enables the overriding of capability negotiation results</td>
<td>page 28-72</td>
</tr>
</tbody>
</table>
### Table 28.8 BGP-Neighbor-Config-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>passive</td>
<td>Enables this BGP neighbor device (or devices using this profile) as passive</td>
<td>page 28-73</td>
</tr>
<tr>
<td>password</td>
<td>Sets a password for this BGP neighbor device (or devices using this profile)</td>
<td>page 28-74</td>
</tr>
<tr>
<td>peer-group</td>
<td>Sets the peer group for this BGP neighbor device (or devices using this profile) (EXPERIMENTAL)</td>
<td>page 28-75</td>
</tr>
<tr>
<td>port</td>
<td>Configures a non-standard BGP port for this BGP neighbor (EXPERIMENTAL)</td>
<td>page 28-76</td>
</tr>
<tr>
<td>remote-as</td>
<td>Configures the ASN for this neighbor BGP device (or devices using this profile)</td>
<td>page 28-77</td>
</tr>
<tr>
<td>remove-private-as</td>
<td>Removes the private ASN from outbound updates (EXPERIMENTAL)</td>
<td>page 28-78</td>
</tr>
<tr>
<td>route-server-client</td>
<td>Enables this BGP neighbor device (or devices using this profile) to act as a route server client (EXPERIMENTAL)</td>
<td>page 28-79</td>
</tr>
<tr>
<td>send-community</td>
<td>Enables sending of the community attribute to the BGP neighbor</td>
<td>page 28-80</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down this BGP neighbor device (or devices using this profile)</td>
<td>page 28-81</td>
</tr>
<tr>
<td>soft-reconfiguration</td>
<td>Enables storing of updates for inbound soft reconfiguration</td>
<td>page 28-82</td>
</tr>
<tr>
<td>strict-capability-match</td>
<td>Enables a strict capability match before allowing a neighbor BGP peer to open a connection (EXPERIMENTAL)</td>
<td>page 28-83</td>
</tr>
<tr>
<td>timers</td>
<td>Configures this BGP neighbor's keepalive and holdtime durations</td>
<td>page 28-84</td>
</tr>
<tr>
<td>unsuppress-map</td>
<td>Uses a route-map that selectively un suppresses routes that have been suppressed using the aggregate-address command</td>
<td>page 28-86</td>
</tr>
<tr>
<td>update-source</td>
<td>Allows BGP sessions to use any operational interface to establish the TCP connection with this neighbor</td>
<td>page 28-87</td>
</tr>
<tr>
<td>use</td>
<td>Configures filters for this neighbor. These filters are BGP IP ACL, IP prefix list, AS path list, and route map. Based on the filters used, updates received from this neighbor are filtered.</td>
<td>page 28-88</td>
</tr>
<tr>
<td>weight</td>
<td>Configures a weight for all routes learned from this BGP neighbor</td>
<td>page 28-89</td>
</tr>
</tbody>
</table>
28.8.1 activate

- bgp-neighbor-config commands

Enables an address family for this neighbor. This option is enabled by default.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax
activate

Parameters
None

Examples
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#activate
28.8.2 advertisement-interval

**bgp-neighbor-config commands**

Configures the minimum interval, in seconds, between two consecutive BGP router updates

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

advertisement-interval <0-600>

**Parameters**
- advertisement-interval <0-600>

| advertisement-interval <0-600> | Configures the minimum interval, in seconds, between two consecutive BGP router updates. Sending too many router updates creates flapping of routes leading to possible disruptions. Specify a minimum interval so that the BGP routing updates are sent after the set interval.  
  - <0-600> – Specify a value from 0 - 600 seconds. The default is 5 seconds. |

**Examples**

```
switch(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
advertisement-interval 100

switch(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
  bgp neighbor 192.168.13.99
  advertisement-interval 100

switch(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

**Related Commands**

- no  
  Reverts the advertisement interval to default (5 seconds)
28.8.3 allowas-in

**bgp-neighbor-config commands**

Enables re-advertisement of all prefixes containing duplicate ASNs. Use this command to configure the maximum number of times an ASN is advertised. This option is disabled by default.

When enabled, Provider Edge (PE) routers can re-advertise all prefixes containing duplicate ASNs. This creates a pair of VPN Routing/Forwarding (VRF) instances on each PE router to receive and re-advertise prefixes. The PE router receives prefixes with ASNs from all PE routers and advertises to its neighbor PE routers on one VRF. The other VRF receives prefixes with ASNs from the Customer Edge (CE) routers and re-advertises them to all PE routers in the configuration.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

allowas-in <1-10>

**Parameters**

- allowas-in <1-10>

<table>
<thead>
<tr>
<th>allowas-in &lt;1-10&gt;</th>
<th>Enables and configures the maximum number of times an ASN is advertised.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;1-10&gt; – Specify a value from 1 - 10.</td>
</tr>
</tbody>
</table>

**Examples**

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
allowas-in 10

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
  bgp neighbor 192.168.13.99
  advertisement-interval 100
  allowas-in 10

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

**Related Commands**

| no | Disables re-advertisement of all prefixes containing duplicate ASNs |
28.8.4 attribute-unchanged

Enables propagation of BGP attribute values unchanged to this neighbor BGP device. The BGP attributes are: as-path, med, and next-hop.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax
attribute-unchanged { (as-path|med|next-hop) }

Parameters

- attribute-unchanged { (as-path|med|next-hop) }

Examples

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)# attribute-unchanged as-path

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
t bgp neighbor 192.168.13.99
t advertisement-interval 100
t allowas-in 10
t attribute-unchanged as-path

Related Commands

no Disables propagation of BGP attribute values unchanged to this neighbor BGP device
28.8.5 capability

**bgp-neighbor-config commands**

Enables the advertisement of capability (dynamic and ORF) to BGP peers

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

capability [dynamic|orf]

capability dynamic

capability orf prefix-list [both|receive|send]

**Parameters**

- **capability dynamic**
  
  Enables the advertisement of dynamic capability
  
  Enable this option to show a neighbor device's capability to advertise or withdraw and address capability to other peers in a non-disruptive manner. This option is disabled by default.

- **capability orf prefix-list [both|receive|send]**
  
  Enables the advertisement of Outbound Router Filtering (ORF) capability. This option is disabled by default.
  
  Enable this option to enable ORF, and advertise this capability to peer devices. ORFs send and receive capabilities to lessen the number of updates exchanged between BGP peers. By filtering updates, ORF minimizes update generation and exchange overhead. The local BGP device advertises ORF in the `send` mode. The peer BGP device receives the ORF capability in the `receive` mode. The two devices exchange updates to maintain the ORF for each router. Only a peer group or an individual BGP router can be configured to be in `receive` or `send` mode. A peer group member cannot be configured.
  
  - **both** — Advertises the capability to send and receive the ORF to/from this neighbor
  - **receive** — Advertises the capability to receive the ORF from this neighbor
  - **send** — Advertises the capability to send the ORF to this neighbor

**Examples**

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
capability orf prefix-list both

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show
context
  bgp neighbor 192.168.13.99
  advertisement-interval 100
  allowas-in 10
  attribute-unchanged as-path
  capability orf prefix-list both

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

**Related Commands**

- **no**
  
  Disables advertisement of capability (dynamic and ORF) to BGP peers
28.8.6 *default-originate*

*bgp-neighbor-config commands*

Enables the sending of the default route to BGP neighbors. It also allows the configuration of the default route. When enabled and configured, local BGP routers send the default route 0.0.0.0 (or a route map specified route) to its neighbor for use as the default route.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

default-originate {route-map <BGP-ROUTE-MAP-NAME>}

**Parameters**

- default-originate {route-map <BGP-ROUTE-MAP-NAME>}

**Examples**

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#default-originate

advertisemen
```

**Related Commands**

- `no` Disables the sending of the default route to BGP neighbors
28.8.7 description

- bgp-neighbor-config commands

Configures a description for this BGP neighbor device

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax

description neighbor <LINE>

Parameters

- description neighbor <LINE>

Examples

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#description neighbor "This neighbor is an external AS neighbor"

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context bgp neighbor 192.168.13.99 advertisement-interval 100 allowas-in 10 attribute-unchanged as-path capability orf prefix-list both default-originate
description neighbor "This neighbor is an external AS neighbor"

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

Related Commands

- no
  Removes this BGP neighbor’s description
28.8.8 disable-connected-check

**bgp-neighbor-config commands**

Enables one-hop away eBGP peer using loop back address. This option is disabled by default.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

disable-connected-check

**Parameters**

None

**Examples**

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#disable-connected-check

   advertisement-interval 100
   allowas-in 10
   attribute-unchanged as-path
   capability orf prefix-list both
   default-originate
description neighbor "This neighbor is an external AS neighbor"
disable-connected-check

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables one-hop away eBGP peer using loop back address</td>
</tr>
</tbody>
</table>
28.8.9 **dont-capability-negotiate**

This command disables capability negotiation with BGP neighbors. This is to allow compatibility with older BGP versions that have no capability parameters used in the `open` messages between peers. Capability negotiation is enabled by default.

**Supported in the following platforms:**
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext```
dont-capability-negotiate
```

**Parameters**

None

**Examples**

```plaintext```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
dont-capability-negotiate
```

```plaintext```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
bgp neighbor 192.168.13.99
  advertisement-interval 100
  allowas-in 10
  attribute-unchanged as-path
  capability orf prefix-list both
  default-originate
  description neighbor "This neighbor is an external AS neighbor"
  disable-connected-check
  dont-capability-negotiate
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Enables capability negotiation with BGP neighbors</td>
</tr>
</tbody>
</table>
28.8.10 `ebgp-multihop`

> **bgp-neighbor-config commands**

Enables **eBGP Multihop** on this BGP neighbor. When enabled, allows neighbor connection to be established between two eBGP neighbors that are not directly connected to each other. Use this command to configure the maximum number of hops possible between two such eBGP neighbors. This option is disabled by default.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

`ebgp-multihop <1-255>`

**Parameters**

- `ebgp-multihop <1-255>`

<table>
<thead>
<tr>
<th><code>ebgp-multihop &lt;1-255&gt;</code></th>
<th>Configures the maximum number of hops that can be between eBGP neighbors not directly connected to each other.</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;1-255&gt;</code></td>
<td>Specify a value from 1 - 255. The default is 255.</td>
</tr>
</tbody>
</table>

**Examples**

```
x9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#ebgp-multihop 20

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
  bgp neighbor 192.168.13.99
  advertisement-interval 100
  allowas-in 10
  attribute-unchanged as-path
  capability orf prefix-list both
  default-originate
  description neighbor "This neighbor is an external AS neighbor"
  disable-connected-check
  dont-capability-negotiate
  `ebgp-multihop 20`

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

**Related Commands**

- `no` Disables eBGP Multihop on this BGP neighbor
28.8.11 `enforce-multihop`

▶ `bgp-neighbor-config commands`

Forces eBGP neighbors to perform multi-hop checks

A *multihop* route is a route to external peers on indirectly connected networks. When enforced, eBGP neighbors perform multi-hop check. This option is disabled by default.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

`enforce-multihop`

**Parameters**

None

**Examples**

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#enforce-multihop

   advertisement-interval 100
   allowas-in 10
   attribute-unchanged as-path
   capability orf prefix-list both
   default-originate
   description neighbor "This neighbor is an external AS neighbor"
   disable-connected-check
   dont-capability-negotiate
   ebgp-multihop 20
   enforce-multihop
```

**Related Commands**

| `no` | Disables enforcement of multihop route checks |
28.8.12 local-as

**bgp-neighbor-config commands**

Configures this neighbor’s local AS number

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

`local-as <1-4294967295> {no-prepend}`

**Parameters**

- `local-as <1-4294967295> {no-prepend}`

<table>
<thead>
<tr>
<th>local-as &lt;1-4294967295&gt; {no-prepend}</th>
<th>Configures the local AS number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;1-4292967295&gt;</code> – Specify a value from 1 - 4294967295.</td>
</tr>
<tr>
<td></td>
<td>• <code>no-prepend</code> – Optional. Select to enable. When enabled, the local AS number is not prepended to route updates from eBGP peers. AS numbers are prepended to route updates by default.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#local-as 20 no-prepend

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context bgp neighbor 192.168.13.99 advertise-interval 100 allowas-in 10 attribute-unchanged as-path capability orf prefix-list both default-originate description neighbor "This neighbor is an external AS neighbor" disable-connected-check dont-capability-negotiate ebgp-multihop 20 enforce-multihop local-as 20 no-prepend

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

**Related Commands**

| no                                      | Removes the local AS number. And also reverts prepending of AS numbers to default (allows prepending). |
28.8.13 maximum-prefix

**bGP-neighbor-config commands**

Configures the maximum number of prefixes that can be received from a BGP neighbor. This option is disabled by default.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
maximum-prefix <1-4294967295> {(<1-100>|restart <1-65535>|warning-only)}
```

**Parameters**

- **maximum-prefix <1-4294967295> {(<1-100>|restart|warning-only)}**

<table>
<thead>
<tr>
<th>maximum-prefix &lt;1-4294967295&gt;</th>
<th>Configures the maximum number of prefixes that can be received from a BGP neighbor</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;1-100&gt; — Optional. Sets the threshold limit for generating a log message. This value represents a percentage of the maximum-prefix configured in the preceding step. When this value is reached, a log entry is generated. For example if the maximum-prefix is set to 100 and threshold limit is set to 65, then after receiving 65 prefixes, a log entry is generated. This option is disabled by default.</td>
<td></td>
</tr>
<tr>
<td>• restart &lt;1-65535&gt; — Optional. Restarts BGP peer connection once the maximum-prefix limit specified is exceeded. For example, If the value specified is 10, then after receiving 10 prefixes from the neighbor, the system restarts the connection with that neighbor. Specify a value from 1 - 65535. This option is disabled by default.</td>
<td></td>
</tr>
<tr>
<td>• warning-only — Configure to enable. When the maximum-prefix limit is exceeded, the connection is restarted. However, when this option is enabled, the connection is not restarted and an event is generated instead. This option is disabled by default.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#maximum-prefix 400 50 warning-only
```

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show con bgp neighbor 192.168.13.99 advertisement-interval 100 allowas-in 10 attribute-unchanged as-path capability orf prefix-list both default-originate description neighbor "This neighbor is an external AS neighbor" disable-connected-check dont-capability-negotiate ebgp-multihop 20 enforce-multihop local-as 20 no-prepend maximum-prefix 400 50 warning-only nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

**Related Commands**

| no | Removes the maximum prefix settings configured for this neighbor |
28.8.14 next-hop-self

Enables next-hop calculation for this neighbor. This option is disabled by default.

When enabled, this device (or devices using this profile) are configured as the next hop for the BGP speaking neighbor or peer group. This allows the BGP device to change the next hop information that is sent to iBGP peers. The next hop address is set to the IP address of the interface used to communicate with the eBGP neighbor.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax
next-hop-self

Parameters
None

Examples
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
next-hop-self

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
bgp neighbor 192.168.13.99
   advertisement-interval 100
   allowas-in 10
   attribute-unchanged as-path
   capability orf prefix-list both
   default-originate
   description neighbor "This neighbor is an external AS neighbor"
   disable-connected-check
   dont-capability-negotiate
ebgp-multihop 20
   enforce-multihop
   local-as 20 no-prepend
   maximum-prefix 400 50 warning-only
   next-hop-self
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables next-hop calculation for this neighbor (this is the default)</td>
</tr>
</tbody>
</table>
**28.8.15 no**

- **bgp-neighbor-config commands**

Removes this BGP neighbor's settings, or reverts them back to default

Supported in the following platforms:
  - Wireless Controllers — RFS4000, RFS6000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

no <PARAMETER>

**Parameters**

- no <PARAMETER>

<table>
<thead>
<tr>
<th>no &lt;PARAMETER&gt;</th>
<th>Specify the parameter details to remove or revert to default</th>
</tr>
</thead>
</table>

**Examples**

The following example shows the neighbor 192.168.13.99 settings before the ‘no’ commands are executed:

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
bgp neighbor 192.168.13.99
  advertisement-interval 100
  allowas-in 10
  attribute-unchanged as-path
capability orf prefix-list both
default-originate
description neighbor "This neighbor is an external AS neighbor"
disable-connected-check
dont-capability-negotiate
ebgp-multihop 20
enforce-multihop
local-as 20 no-prepend
maximum-prefix 400 50 warning-only
next-hop-self
```

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#no advertisement-interval
```

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#no disable-connected-check
```

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#no default-originate
```

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#no local-as
```

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
bgp neighbor 192.168.13.99
  allowas-in 10
  attribute-unchanged as-path
capability orf prefix-list both
description neighbor "This neighbor is an external AS neighbor"
dont-capability-negotiate
ebgp-multihop 20
maximum-prefix 400 50 warning-only
next-hop-self
```

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```
28.8.16 **override-capability**

* bgp-neighbor-config commands

Enables the overriding of capability negotiation results. This option is disabled by default.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
override-capability
```

**Parameters**

None

**Examples**

```plaintext
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
override-capability
	nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
	nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context

bnp neighbor 192.168.13.99
advertisement-interval 100
allowas-in 10
attribute-unchanged as-path
capability orf prefix-list both
default-originate
description neighbor "This neighbor is an external AS neighbor"
disable-connected-check
dont-capability-negotiate
ebgp-multihop 20
enforce-multihop
local-as 20 no-prepend
maximum-prefix 400 50 warning-only
next-hop-self
override-capability
	nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the overriding of capability negotiation results</td>
</tr>
</tbody>
</table>
28.8.17 **passive**

- **bgp-neighbor-config commands**

  Enables this BGP neighbor device (or devices using this profile) as passive. When enabled, local devices do not attempt to open a connection to passive BGP neighbors. This option is disabled by default.

  Supported in the following platforms:
  - Wireless Controllers — RFS4000, RFS6000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
 passive
```

**Parameters**

None

**Examples**

```
 nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#passive
   advertisement-interval 100
   allowas-in 10
   attribute-unchanged as-path
   capability orf prefix-list both
   default-originate
   description neighbor "This neighbor is an external AS neighbor"
   disable-connected-check
   dont-capability-negotiate
   ebgp-multihop 20
   enforce-multihop
   local-as 20 no-prepend
   maximum-prefix 400 50 warning-only
   next-hop-self
   override-capability
   passive
 nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables this BGP neighbor device (or devices using this profile) as passive</td>
</tr>
</tbody>
</table>
### 28.8.18 password

Sets a password for this BGP neighbor device (or devices using this profile). When configured, this password is used for Message Digest 5 (MD5) authentication between two BGP peers connected over TCP. To enable MD5 authentication between two BGP peers, configure both with the same password.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

#### Syntax
```
password neighbor <LINE>
```

#### Parameters
- `password neighbor <LINE>`

#### Examples
```bash
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#password neighbor eBGPneighbor@300

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)# show context
    bgp neighbor 192.168.13.99
    advertisement-interval 100
    allowas-in 10
    attribute-unchanged as-path
    capability orf prefix-list both
    default-originate
    description neighbor "This neighbor is an external AS neighbor"
    disable-connected-check
    dont-capability-negotiate
    ebgp-multihop 20
    enforce-multihop
    local-as 20 no-prepend
    maximum-prefix 400 50 warning-only
    next-hop-self
    override-capability
    passive
    password neighbor eBGPneighbor@300

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

#### Related Commands
- `no password neighbor <LINE>` Removes the password configured for this neighbor
28.8.19 peer-group

- bgp-neighbor-config commands

Sets the peer group for this BGP neighbor device (or devices using this profile). Peer groups are a set of BGP neighbors with the same update policies. This facilitates the updates of various policies, such as, distribute lists and filter lists.

The peer group can be configured as a single entity. Any changes made to the peer group is propagated to all members.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax

peer-group <PEER-GROUP-NAME>

Parameters

- peer-group <PEER-GROUP-NAME>

Examples

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#peer-group eBGPPeerGrp1

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
  bgp neighbor 192.168.13.99
  advertisement-interval 100
  peer-group eBGPPeerGrp1
  allowas-in 10
  attribute-unchanged as-path
  capability orf prefix-list both
  default-originate
  description neighbor "This neighbor is an external AS neighbor"
  disable-connected-check
  dont-capability-negotiate
  ebgp-multihop 20
  enforce-multihop
  local-as 20 no-prepend
  maximum-prefix 400 50 warning-only
  next-hop-self
  override-capability
  passive
  password neighbor eBGPneighbor@300

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

Related Commands

no

Removes the peer group configuration. This neighbor peer group setting is removed.
28.8.20 port

► bgp-neighbor-config commands

Configures a non-standard BGP port for this BGP neighbor

By default BGP uses port 179. Use this command to set a non standard port for this BGP neighbor.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax

port <0-65535>

Parameters

- port <0-65535>

| port <0-65535> | Specify a value from 0 - 65535. |

Examples

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#port 21

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
  bgp neighbor 192.168.13.99
  advertisement-interval 100
  peer-group eBGPPeerGrp1
  port 21
  allowas-in 10
  attribute-unchanged as-path
  capability orf prefix-list both
  default-originate
  description neighbor "This neighbor is an external AS neighbor"
  disable-connected-check
  dont-capability-negotiate
  ebgp-multihop 20
  enforce-multihop
  local-as 20 no-prepend
  maximum-prefix 400 50 warning-only
  next-hop-self
  override-capability
  passive
  password neighbor eBGPneighbor@300
```

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

Related Commands

| no | Removes the non standard port configured for this neighbor |
28.8.21 **remote-as**

*bgp-neighbor-config commands*

Configures the ASN for this neighbor BGP device (or devices using this profile). ASN is a set of routers under the same administration that use *Interior Gateway Protocol* (IGP) and common metrics to define how to route packets within the AS.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

remote-as <1-4294967295>

**Parameters**

- remote-as <1-4294967295>

**Examples**

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#remote-as 100

   remote-as 100
   advertisement-interval 100
   peer-group eBGPPeerGrp1
   port 21
   allowas-in 10
   attribute-unchanged as-path
   capability orf prefix-list both
   default-originate
   description neighbor "This neighbor is an external AS neighbor"
   disable-connected-check
dont-capability-negotiate
ebgp-multihop 20
enforce-multihop
local-as 20 no-prepend
maximum-prefix 400 50 warning-only
next-hop-self
override-capability
passive
password neighbor eBGPneighbor@300

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
28.8.22 remove-private-as

- `bgp-neighbor-config commands`

Removes the private ASN from outbound updates. By default, private ASNs are included in outbound updates. Private AS numbers are not advertised to the Internet. This option is used with external BGP (eBGP) peers only. The router removes the AS numbers only if the update includes private AS numbers. If the update includes both private and public AS numbers, the system treats it as an error.

This option is disabled by default.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

`remove-private-as`

**Parameters**

None

**Examples**

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
remove-private-as

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
bgp neighbor 192.168.13.99
  remote-as 100
  advertisement-interval 100
  peer-group eBGPPeerGrp1
  port 21
  allowas-in 10
  attribute-unchanged as-path
  capability orf prefix-list both
  default-originate
  description neighbor "This neighbor is an external AS neighbor"
  disable-connected-check
  dont-capability-negotiate
  ebgp-multihop 20
  enforce-multihop
  local-as 20 no-prepend
  maximum-prefix 400 50 warning-only
  next-hop-self
  override-capability
  passive
  password neighbor eBGPneighbor@300
  remove-private-as
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

**Related Commands**

| Command   | Description                                                      |
|-----------|                                                                 |
| `no`      | Includes private ASNs in outbound updates (this is the default setting) |
28.8.23 route-server-client

Enables this BGP neighbor device (or devices using this profile) to act as a route server client. This option is disabled by default.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax
route-server-client

Parameters
None

Examples
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
route-server-client

remote-as 100
advertisement-interval 100
peer-group eBGP Peer Grp 1
port 21
allow-as-in 10
attribute-unchanged as-path
capability orf prefix-list both
default.originate
description neighbor "This neighbor is an external AS neighbor"
disable-connected-check
don't-capability-negotiate
ebgp-multihop 20
enforce-multihop
local-as 20 no-prepend
maximum-prefix 400 50 warning-only
next-hop-self
override-capability
passive
password neighbor eBGPneighbor@300
remove.private-as
route-server-client

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables this BGP neighbor device (or devices using this profile) to act as a route server client</td>
</tr>
</tbody>
</table>
28.8.24 send-community

*bgp-neighbor-config commands*

Enables sending of the community attribute to the BGP neighbor. The community attribute groups destinations in a certain community and applies routing decisions based on the community. On receiving community attribute, the BGP router announces it to the neighbor.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
send-community [both|extended|standard]
```

**Parameters**

- `send-community [both|extended|standard]`

| send-community [both|extended|standard] | Enables sending of the community attributes to the BGP neighbor |
|----------------------------------------|---------------------------------------------------------------|
|                                       | • both – Sends extended and standard community attributes     |
|                                       | • extended – Sends extended community attributes only         |
|                                       | • standard – Sends standard community attributes only         |

**Examples**

```bash
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
send-community both
	nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#show context
bgp neighbor 192.168.13.99
remote-as 100
advertisement-interval 100
peer-group eBGPPeerGrp1
port 21
allowas-in 10
attribute-unchanged as-path
capability orf prefix-list both
default-originate
description neighbor "This neighbor is an external AS neighbor"
disable-connected-check
dont-capability-negotiate
ebgp-multihop 20
enforce-multihop
local-as 20 no-prepend
maximum-prefix 400 50 warning-only
next-hop-self
override-capability
passive
password neighbor eBGPneighbor@300
remove-private-as
route-server-client
send-community both
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables sending of the community attribute to the BGP neighbor</td>
</tr>
</tbody>
</table>
**28.8.25 shutdown**

- **bgp-neighbor-config commands**

  Shuts down this BGP neighbor device (or devices using this profile). When configured, this neighbor is administratively shut down. This option is disabled by default.

  Supported in the following platforms:
  - Wireless Controllers — RFS4000, RFS6000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

  **Syntax**
  
  shutdown

  **Parameters**
  
  None

  **Examples**

  nx9500-6C8809(config-profile testNX500-router-bgp-neighbor-192.168.13.99)#shutdown


  nx9500-6C8809(config-profile testNX500-router-bgp-neighbor-192.168.13.99)#

  **Related Commands**

| no        | Removes the administrative shut down of this neighbor |
28.8.26 **soft-reconfiguration**

- **bgp-neighbor-config commands**

  Enables storing of updates for inbound soft reconfiguration. This option is disabled by default.

  Soft-reconfiguration can be used in lieu of BGP route refresh capability. Enabling this option enables local storage of all received routes and their attributes. This requires additional memory on the BGP device.

  When a soft reset (inbound) is performed on the neighbor device, the locally stored routes are reprocessed according to the inbound policy. The BGP neighbor connection is not affected.

  Supported in the following platforms:
  - Wireless Controllers — RFS4000, RFS6000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
soft-reconfiguration inbound
```

**Parameters**

- `soft-reconfiguration inbound`

**Examples**

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
soft-reconfiguration inbound
```

**Related Commands**

- **no**

  Disables soft reconfiguration
28.8.27 strict-capability-match

- bgp-neighbor-config commands

Enforces a strict capability match before allowing a TCP connection with this neighbor. In case capabilities do not match, the BGP connection is not established. This option is disabled by default.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

Syntax

strict-capability-match

Parameters

None

Examples

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#strict-capability-match

Related Commands

| no | Disables a strict capability match before allowing a connection with this neighbor |
### 28.8.28 timers

**bgp-neighbor-config commands**

Configures this BGP neighbor’s keepalive and holdtime durations

**NOTE:** The keepalive and holdtime settings configured at the neighbor level override those configured on the BGP router.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
timers [<0-65535> <0-65535>|connect <0-65535>]
```

**Parameters**

- `timers [<0-65535> <0-65535>|connect <0-65535>]`

<table>
<thead>
<tr>
<th>timers &lt;0-65535&gt;</th>
<th>Sets the keepalive and holdtime intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-65535&gt;</td>
<td>Specifies the keepalive interval from 0 - 65535 seconds. It is the interval, in seconds, between two successive keepalive packets exchanged with this neighbor to keep the TCP connection alive.</td>
</tr>
<tr>
<td></td>
<td>Specifies the holdtime interval from 0 - 65535. This is the time this neighbor will wait without receiving a keepalive packet from its neighbor before declaring it dead. If the time since the last keepalive packet received (from its neighbor) exceeds the value set here, the neighbor is declared dead.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>timers connect</th>
<th>Sets the BGP connect time. This is the interval, in seconds, after which BGP tries to connect to a dead peer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-65535&gt;</td>
<td>&lt;0-65535&gt; – Specify a value from 1 - 65535 seconds.</td>
</tr>
</tbody>
</table>

**Examples**

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#timers 20 40

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#timers connect 20

remote-as 100
advertisement-interval 100
peer-group eBGPPeerGrpl
port 21
strict-capability-match
timers connect 20
timers 20 40
allowas-in 10
attribute-unchanged as-path
capability orf prefix-list both
default-originate
description neighbor "This neighbor is an external AS neighbor"
disable-connected-check
dont-capability-negotiate
ebgp-multihop 20
enforce-multihop
local-as 20 no-prepend
maximum-prefix 400 50 warning-only
next-hop-self
override-capability
passive
```
password neighbor eBGPneighbor@300
remove-private-as
route-server-client
send-community both

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the holdtime value set for this neighbor</td>
</tr>
</tbody>
</table>
28.8.29 unsuppress-map

*bgp-neighbor-config commands*

Unsuppresses map to selectively advertise routes that have been suppressed using the *aggregate-address* command.

The aggregate-address command creates a route map with a IP/mask address that consolidates subnets under it. This reduces the number of route maps on the BGP device to one consolidated entry. Use unsuppress-map to selectively allow/deny a subnet or a set of subnets from this consolidated entry.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
unsuppress-map <ROUTE-MAP-NAME>
```

**Parameters**

- unsuppress-map <ROUTE-MAP-NAME>

**Examples**

```
nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp-neighbor-192.168.13.99#
unsuppress-map test
```

```
nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp-neighbor-192.168.13.99#show
context
  bgp neighbor 192.168.13.99
  remote-as 199
  maximum-prefix 9999 80 restart 50
unsuppress-map test
```

**Related Commands**

```
no
```

Removes the unsuppress flag applied on the specified route map
28.8.30 update-source

* bgp-neighbor-config commands*

Allows BGP sessions to use any operational interface to establish the TCP connection with this neighbor.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**
update-source <IPv4>

**Parameters**
- update-source <IPv4>

<table>
<thead>
<tr>
<th>update-source &lt;IPv4&gt;</th>
<th>Specify the BGP enabled neighbor's IPv4 address.</th>
</tr>
</thead>
</table>

**Examples**

remote-as 100
advertisement-interval 100
peer-group eBGPPeerGrp1
port 21
strict-capability-match
timers connect 20
timers 20 40
allowas-in 10
attribute-unchanged as-path
capability orf prefix-list both
default-originate
description neighbor "This neighbor is an external AS neighbor"
disable-connected-check
dont-capability-negotiate
ebgp-multihop 20
enforce-multihop
local-as 20 no-prepend
maximum-prefix 400 50 warning-only
next-hop-self
override-capability
passive
password neighbor eBGPneighbor@300
remove-private-as
route-server-client
send-community both
update-source 192.168.13.1

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

**Related Commands**

| no | Removes the source of routing updates |
28.8.31 use

**bgp-neighbor-config commands**

Configures filters for this neighbor. These filters are BGP IP ACL, IP prefix list, AS path list, and route map. Based on the filters used, updates received from this neighbor are filtered.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

use [distribute-list <BGP-IP-ACL-NAME>|filter-list <AS-PATH-LIST-NAME>|
prefix-list <IP-PREFIX-LIST-NAME>|route-map <BGP-ROUTE-MAP-NAME>]

**Parameters**

- use [distribute-list <BGP-IP-ACL-NAME>|filter-list <AS-PATH-LIST-NAME>|
prefix-list <IP-PREFIX-LIST-NAME>|route-map <BGP-ROUTE-MAP-NAME>]

| use [distribute-list <BGP-IP-ACL-NAME>]|filter-list <AS-PATH-LIST-NAME>|
prefix-list <IP-PREFIX-LIST-NAME>|
route-map <BGP-ROUTE-MAP-NAME> | Uses predefined and configured filters with this neighbor

- distribute-list <BGP-IP-ACL-NAME> – Uses a BGP IP ACL
- <BGP-IP-ACL-NAME> – Specify the BGP IP ACL name.
- filter-list <AS-PATH-LIST-NAME> – Uses an AS path list
- <AS-PATH-LIST-NAME> – Specify the AS path list name.
- prefix-list <IP-PREFIX-LIST-NAME> – Uses an IP prefix list
- <IP-PREFIX-LIST-NAME> – Specify the IP prefix list name.
- route-map <BGP-ROUTE-MAP-NAME> – Uses a route map
- <BGP-ROUTE-MAP-NAME> – Specify the route map name.

**Examples**

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp-neighbor-192.168.13.99)#
use filter-list FilterList_01 in

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp-neighbor-192.168.13.99)#use route-map testBGPRouteMap out

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp-neighbor-192.168.13.99)#show context
  bgp neighbor 192.168.13.99
  remote-as 199
  use filter-list FilterList_01 in
  maximum-prefix 9999 80 restart 50
  use route-map testBGPRouteMap out
  unsuppress-map test

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp-neighbor-192.168.13.99)#

**Related Commands**

**no**

Removes the filters used to filter updates received from this neighbor.
28.8.32 weight

**bgp-neighbor-config commands**

Configures a weight for all routes learned from this BGP neighbor. Weight is used to decide the preferred route when the same route is learned from multiple neighbors. The highest weight is always chosen.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510, NX9600

**Syntax**

weight <0-65535>

**Parameters**
- weight <0-65535>

<table>
<thead>
<tr>
<th>weight &lt;0-65535&gt;</th>
<th>Specifies a relative weightage for all routes learned from this neighbor</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;0-65535&gt;</td>
<td>Specify a value from 0 - 65535.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#weight 10
```

```bash
remote-as 100
advertisement-interval 100
peer-group eBGPpeerGrp1
port 21
strict-capability-match
timers connect 20
timers 20 40
allow-as-in 10
attribute-unchanged as-path
capability orf prefix-list both
default-originate
description neighbor "This neighbor is an external AS neighbor"
disable-connected-check
dont-capability-negotiate
ebgp-multihop 20
enforce-multihop
local-as 20 no-prepend
maximum-prefix 400 50 warning-only
next-hop-self
override-capability
 passive
 password neighbor eBGPneighbor@300
 remove-private-as
 route-server-client
 send-community both
 update-source 192.168.13.1
```

**Related Commands**

<table>
<thead>
<tr>
<th>no</th>
<th>Reverts to default value</th>
</tr>
</thead>
</table>
CHAPTER 29
CRYPTO-CMP-POLICY

This chapter summarizes the crypto certificate management protocol (CMP) policy commands in the CLI command structure.

CMP is an Internet protocol designed to enable devices (access point, wireless controller, or service platform) to obtain and manage digital certificates in a Public Key Infrastructure (PKI) network. A Certificate Authority (CA) issues the certificates using the defined CMP.

WiNG CMP implementation allows you to configure a crypto CMP policy that enables auto installation and auto management of device certificates. When configured and implemented on a device, the crypto CMP policy allows the device to automatically trigger a certification request to a configured, CMP supported certificate authority (CA) server. Once the certificate is validated and confirmed from the CA server it is saved on the device and becomes part of the trustpoint. During the creation of the CMP policy the trustpoint is assigned a name and client information. You can use a manually created trustpoint for one service (like HTTPS) and use the CMP generated trustpoint for RADIUS EAP certificate based authentication.

Use the (config) instance to configure a crypto CMP policy. To navigate to the crypto CMP policy configuration instance, use the following commands:

```
<DEVICE>(config)#crypto-cmp-policy <CRYPTO-CMP-POLICY-NAME>
ap6522-D8273A(config)#crypto-cmp-policy CMP
ap6522-D8273A(config-cmp-policy-CMP)#
ap6522-D8273A(config-cmp-policy-CMP)#?
```

CMP Policy Mode commands:
- `ca-server` CMP CA Server configuration commands
- `cert-key-size` Set key size for certificate request
- `cert-renewal-timeout` Trigger a cert renewal request on timeout
- `cross-cert-validate` Validate cross-cert using factory-cert
- `no` Negate a command or set its defaults
- `subjectAltName` Configure subjectAltName value
- `trustpoint` Trustpoint for CMP
- `use` Set setting to use
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `do` Run commands from Exec mode
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
ap6522-D8273A(config-cmp-policy-CMP)#
```
This chapter is organized as follows:

- `crypto-cmp-policy-instance`
- `other-cmp-related-commands`

**NOTE:** The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
29.1 crypto-cmp-policy-instance

The following table summarizes crypto CMP policy configuration commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ca-server</td>
<td>Configures the CA server details</td>
<td>page 29-4</td>
</tr>
<tr>
<td>cert-key-size</td>
<td>Configures the size of the key associated with a certificate request</td>
<td>page 29-5</td>
</tr>
<tr>
<td>cert-renewal-timeout</td>
<td>Configures a certificate renewal timeout in days</td>
<td>page 29-6</td>
</tr>
<tr>
<td>cross-cert-validate</td>
<td>Enables validation of the cross certificate with the factory certificate</td>
<td>page 29-7</td>
</tr>
<tr>
<td>subjectAltName</td>
<td>Configures an alternate subject name for this CMP policy</td>
<td>page 29-8</td>
</tr>
<tr>
<td>trustpoint</td>
<td>Configures a trustpoint and its associated information, such as the subject name, the sender's (device requesting certification) details, and the recipient's (CA) details</td>
<td>page 29-9</td>
</tr>
<tr>
<td>use</td>
<td>Associates a device's autogen-uniqueid with this crypto CMP policy</td>
<td>page 29-11</td>
</tr>
<tr>
<td>no</td>
<td>Removes the crypto CMP policy settings</td>
<td>page 29-12</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
### 29.1.1 ca-server

**crypto-cmp-policy-instance**

- Configures the primary and secondary CMP CA server details.

The CA is an external network authority (usually a trusted third-party server) that generates and issues digital certificates in response to requests received from network devices. Use this command to configure the primary and secondary CA server details, such as name of the device hosting the CA server, the port used to access the CA server, and the path where the certificate is stored. Once defined, devices using this CMP policy automatically send requests to the specified primary CA server, and retrieve the certificate from the specified location. If the primary CA server is not reachable, the requests are sent to the secondary CA server.

Supported in the following platforms:
- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
ca-server [primary|secondary] host <IP> port <1-65535> path <PATH>
```

**Parameters**

- `ca-server [primary|secondary] host <IP> port <1-65535> path <PATH>`

- **ca-server [primary|secondary]**
  - Configures the primary and secondary CMP CA server details (IPv4 address, port, and path)
  - `primary` — Configures the primary CMP CA server’s details
  - `secondary` — Configures the secondary CMP CA server’s details

  **Note:** The secondary CMP CA is used in case the primary CA server is not reachable.

CA server settings are required to complete CMP requests.

- `host <IP>`
  - Configures IPv4 address of the device hosting the primary/secondary CA server
  - `<IP/HOSTNAME>` — Specify the server’s IPv4 address.

- `port <1-65535>`
  - Configures the port on which the primary/secondary CA server can be reached
  - `<1-65535>` — Specify the port number from 1 - 65535.

- `path <PATH>`
  - Configures the path or filename of the primary/secondary CMP CA certificate. Enter the complete relative path to the file on the server.
  - `<PATH>` — Specify the path. Once specified, the certificate is downloaded from this location and installed on the device.

**Examples**

```
ap6522-D8273A(config-cmp-policy-CMP)#ca-server primary host 192.168.8.74 port 8 path cmp
```

```
ap6522-D8273A(config-cmp-policy-CMP)#show context
crypto-cmp-policy CMP
ca-server primary host 192.168.8.74 port 80 path cmp
```

**Related Commands**

- **no**
  - Removes the configured primary/secondary CA server details
29.1.2 cert-key-size

`crypto-cmp-policy-instance`

Configures the size of the key associated with a certificate request

Supported in the following platforms:
- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```
cert-key-size [2048|3072|4096]
```

Parameters

- `cert-key-size [2048|3072|4096]`

Examples

```
nx9500-6C8809(config-cmp-policy-test)#cert-key-size 3072

nx9500-6C8809(config-cmp-policy-test)#show context
crypto-cmp-policy test
cert-key-size 3072
trustpoint cmp-test subject-name "CN=ExampleCompany, O=Example Company" secret 2
osr2bwJR+0L+G64ny3wfuAAAAAtTFjeFnv0IixTHLDfgt7Bu reference-id 123456 sender-name "CN=ExampleCompany.com, O=Example Company" recipient-name "O=Example Company, CN=ExampleCompany.com"
nx9500-6C8809(config-cmp-policy-test)#
```

Related Commands

```
no
```

Reverts the certificate request key size to default (2048 bits)
29.1.3 `cert-renewal-timeout`

*crypto-cmp-policy-instance*

Configures a certificate renewal timeout in days. This is the number of days, before the expiration of the device’s certificate, that a certificate renewal is triggered.

The expiration of device’s certificate is checked once a day. When a certificate is about to expire a certificate renewal is initiated with the dedicated CMP CA server resource through an existing IPSec tunnel. If the tunnel is not established, the CMP renewal request is not sent. If a renewal succeeds the newly obtained certificate overwrites an existing certificate. If the renewal fails, an error is logged.

Supported in the following platforms:

- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
cert-renewal-timeout <1-60>
```

**Parameters**

- `cert-renewal-timeout <1-60>`

<table>
<thead>
<tr>
<th>cert-renewal-timeout &lt;1-60&gt;</th>
<th>Configures the certificate renewal timeout in days. This is the number of days, before the expiration of the device’s certificate, that a certificate renewal is triggered. Once the configured time is completed, the device triggers a certificate renewal request.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-60&gt; – Specify a value from 1 - 60 days. The default is fourteen (14) days. Therefore, by default a device triggers certificate renewal request 14 days before its certificate expires.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```apl
ap6522-D8273A(config-cmp-policy-CMP)#cert-renewal-timeout 60

ap6522-D8273A(config-cmp-policy-CMP)#show context
crypto-cmp-policy CMP
cert-renewal-timeout 60
crypto-cmp-policy instance ca-server primary host 192.168.8.74 port 8 path cmp
```

**Related Commands**

- `no` Reverts the certificate renewal timeout to default (14 days)
29.1.4 cross-cert-validate

crypto-cmp-policy-instance

Enables validation of the cross certificate using the factory certificate. When enabled, the obtained cross-certificate is validated against the operator’s certificate configured using the trustpoint > cmp-auth-operator command. An error message is displayed in case the cross-certificate is not obtained or if the cross-certificate is found to be invalid. This option is disabled by default.

**NOTE:** To the operator certificate, in the device configuration mode execute the trustpoint > cmp-auth-operator command. For more information, see trustpoint (device-config-mode).

Supported in the following platforms:
- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**
cross-cert-validate

**Parameters**
None

**Examples**
nx9500-6C8809(config-cmp-policy-test)#cross-cert-validate

nx9500-6C8809(config-cmp-policy-test)#show context
crypto-cmp-policy test
cert-key-size 3072
cross-cert-validate
trustpoint cmp-test subject-name "CN=ExampleCompany, O=Example Company" secret 2 9piulK/GqvD+G4ny3ufuAAAAuqC18WJkNjwyMD9IAPk4T reference-id 123456 sender-name "CN=ExampleCompany.com, O=Example Company" recipient-name "O=Example Company, CN=ExampleCompany.com"
nx9500-6C8809(config-cmp-policy-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables validation of the cross certificate with the factory certificate</td>
</tr>
</tbody>
</table>
29.1.5 subjectAltName

Configures the subjectAltName identity for this CMP policy

Supported in the following platforms:

- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

subjectAltName [address <IP>|dn <DISTINGUISHED-NAME>|email <EMAIL-ID>|fqdn <FQDN>|string <USER-DEFINED-STRING>]

Parameters

- subjectAltName [address <IP>|dn <DISTINGUISHED-NAME>|email <EMAIL-ID>|fqdn <FQDN>|string <USER-DEFINED-STRING>]

| subjectAltName [address <IP>|dn <DISTINGUISHED-NAME>|email <EMAIL-ID>|fqdn <FQDN>|string <USER-DEFINED-STRING>] | Configures the subjectAltName identity using one of the following options: |
| address <IP> – Uses IP address as identity |
| <IP> – Specify the IP address. |
| dn <DISTINGUISHED-NAME> – Uses distinguished name as identity |
| <DISTINGUISHED-NAME> – Specify the DISTINGUISHED-NAME. |
| email <EMAIL-ID> – Uses e-mail address as identity |
| <EMAIL-ID> – Specify the e-mail address. |
| fqdn <FQDN> – Uses FQDN as identity |
| <FQDN> – Specify the FQDN. |
| string <USER-DEFINED-STRING> – Uses a user specified name as identity |
| <USER-DEFINED-STRING> – Specify the string to use as identity. |

Examples

ap6522-D8273A(config-cmp-policy-CMP)#subjectAltName dn TechPubsCA

ap6522-D8273A(config-cmp-policy-CMP)#show context
crypto-cmp-policy CMP
cert-update
cert-renewal-timeout 60
cr-server primary host 192.168.8.74 port 8 path cmp
subjectAltName dn TechPubsCA
ap6522-D8273A(config-cmp-policy-CMP)#

Related Commands

| no | Removes the subjectAltName identity configured with this CMP policy |
29.1.6 trustpoint

- crypto-cmp-policy-instance

Configures a trustpoint and its associated information, such as the subject name, the sender’s (device requesting certification) details, and the recipient’s (CA) details. This information is needed to obtain the certificate from the CA server using CMP.

Each certificate is digitally signed by a trustpoint and contains device-specific information, such as device name, IP address, serial number. It helps to uniquely identify a device.

Supported in the following platforms:
- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

```plaintext
trustpoint <TRUSTPOINT-NAME> subject-name <WORD> secret [0 <WORD>|2 <WORD>] reference-id <WORD> sender-name <WORD> [recipient-name <WORD>|ca-psk <CERT-PATH>]
```

Parameters

- **trustpoint <TRUSTPOINT-NAME>**
  - Configures a trustpoint name (should not exceed 32 characters)
  - `<TRUSTPOINT-NAME>` – Specify the trustpoint’s name.

- **subject-name <WORD>**
  - Configures a subject name for this trustpoint. The subject name should uniquely identify the certificate and should not exceed 512 characters in length.

- **secret [0 <WORD>|2 <WORD>]**
  - Configures the secret used to encrypt the trustpoint. The secret should not exceed 128 characters in length.
  - `0 <WORD>` – Configures a clear text password
  - `2 <WORD>` – Configures an encrypted password

- **reference-id <WORD>**
  - Configures the reference ID. The CA server uses this information to identify the shared secret key used.
  - `<WORD>` – Specify the reference ID.

- **sender-name <WORD>**
  - Configures the sender’s name. The CA server uses this information to identify the shared secret key used. The sender’s name should not exceed 512 characters in length.
  - `<WORD>` – Specify the sender name.

- **recipient-name**
  - Configures the recipient’s name. The CA server uses this information to validate the request. The recipient's name should not exceed 256 characters in length.

- **ca-psk <CERT-PATH>**
  - Configures the certificate path for the server certificate
  - `<CERT-PATH>` – Specify the certificate path.
Examples

ap6522-D8273A(config-cmp-policy-CMP)#trustpoint cmp-test subject-name "CN=Example Company, O=Example Company" secret 0 test-secret reference-id 123456 sender-name "CN=ExampleCompany.com, O=Example Company" recipient-name "O=Example Company, CN=ExampleCompany.com"

ap6522-D8273A(config-cmp-policy-CMP)#

ap6522-D8273A(config-cmp-policy-CMP)#show context crypto-cmp-policy CMP
cert-update
cert-renewal-timeout 60
calendar primary host 192.168.8.74 port 8 path cmp
trustpoint cmp-test subject-name "CN=Example Company, O=Example Company" secret 0 test-secret reference-id 123456 sender-name "CN=ExampleCompany.com, O=Example Company" recipient-name "O=Example Company, CN=ExampleCompany.com"
subjectAltName dn TechPubsCA

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the trustpoint associated with this crypto CMP policy</td>
</tr>
</tbody>
</table>
29.1.7 use

- crypto-cmp-policy-instance

Associates a device’s autogen-uniqueid with this crypto CMP policy.

A device’s autogen-uniqueid is a combination of a user-defined string (prefix or suffix) and a substitution token. The WiNG software implementation provides two built-in substitution tokens: $SN and $MiNT-ID that represent the device’s serial number and MiNT ID respectively. These substitution tokens are internally retrieved and combined with the user-defined string to auto generate a unique identity for a device.

To auto generate the device’s unique ID, in the device configuration mode execute the following command:

```plaintext
autogen-uniqueid <WORD>
```

For more information on the autogen-uniqueid command, see `autogen-uniqueid`.

Supported in the following platforms:

- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
use autogen-uniqueid
```

**Parameters**

- use autogen-uniqueid

| use autogen-uniqueid | Associates a device’s autogen-uniqueid with this crypto CMP policy. The device’s autogen-uniqueid should be existing and configured. |

**Examples**

```plaintext
ap6522-D8273A(config-cmp-policy-CMP)#use autogen-uniqueid

ap6522-D8273A(config-cmp-policy-CMP)#show context
crypto-cmp-policy CMP
cert-update
cert-renewal-timeout 60
use autogen-uniqueid
cert-server primary host 192.168.8.74 port 8 path cmp
trustpoint cmp-test subject-name "CN=ExampleCompany, O=Example Company" secret 0 test-secret reference-id 123456 sender-name "CN=ExampleCompany.com, O=Example Company"
recipient-name "O=Example Company, CN=ExampleCompany.com"
sender-AltName dn TechPubsCA
```

**Related Commands**

- no
  - Removes the device’s autogen-uniqueid associated with this crypto CMP policy
29.1.8 no

*crypto-cmp-policy-instance*

Removes or reverts this crypto CMP policy settings

Supported in the following platforms:

- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```plaintext
no [ca-server <SERVER-NAME>|cert-key-size|cert-renewal-timeout|cross-cert-validate|
subjectAltName|trustpoint <TRUSTPOINT-NAME>|use autogen-uniqueid]
```

**Parameters**

- `no <PARAMETERS>`

---

**Examples**

```plaintext
ap6522-D8273A(config-cmp-policy-CMP)#show context
cert-update
cert-renewal-timeout 60
use autogen-uniqueid
ca-server primary host 192.168.8.74 port 8 path cmp
trustpoint cmp-test subject-name "CN=ExampleCompany, O=Example Company" secret 0 test-
secret reference-id 123456 sender-name "CN=ExampleCompany.com, O=Example Company"
recipient-name "O=Example Company, CN=ExampleCompany.com"
subjectAltName dn TechPubsCA
ap6522-D8273A(config-cmp-policy-CMP)#

ap6522-D8273A(config-cmp-policy-CMP)#no cert-renewal-timeout
ap6522-D8273A(config-cmp-policy-CMP)#no subjectAltName

ap6522-D8273A(config-cmp-policy-CMP)#show context
cert-update
cert-renewal-timeout 60
use autogen-uniqueid
ca-server primary host 192.168.8.74 port 8 path cmp
trustpoint cmp-test subject-name "CN=ExampleCompany, O=Example Company" secret 0 test-
secret reference-id 123456 sender-name "CN=ExampleCompany.com, O=Example Company"
recipient-name "O=Example Company, CN=ExampleCompany.com"
subjectAltName dn TechPubsCA
ap6522-D8273A(config-cmp-policy-CMP)#
```
29.2 other-cmp-related-commands

The following table summarizes other commands associated with the implementation of the crypto CMP policy:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>use</td>
<td>Associates a crypto CMP policy with a device</td>
<td>page 29-14</td>
</tr>
<tr>
<td>show</td>
<td>Displays current status of CMP requests in progress. This command also displays trustpoint details (CMP and non-CMP trustpoints).</td>
<td>page 29-15</td>
</tr>
</tbody>
</table>
29.2.1 `use`

- `other-cmp-related-commands`

Applies a crypto CMP policy to a device. Once CMP enabled, the device automatically requests for a certificate from the CA server and installs it. After applying the CMP policy, commit and write the change to memory. This is needed to apply this configuration across reboots.

To apply a CMP policy on a device, navigate to the device's config-device mode and execute the `use > crypto-cmp-policy> <CRYPTO-CMP-POLICY-NAME>` command.

Supported in the following platforms:

- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
use crypto-cmp-policy <CRYPTO-CMP-POLICY-NAME>
```

**Parameters**

- `use crypto-cmp-policy <CRYPTO-CMP-POLICY-NAME>`

<table>
<thead>
<tr>
<th>cmp-policy &lt;CRYPTO-CMP-POLICY-NAME&gt;</th>
<th>Applies an existing crypto CMP policy on this device. When associated with a profile, the crypto CMP policy is applied to all devices using the profile.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>&lt;CRYPTO-CMP-POLICY-NAME&gt;</code> – Specify the crypto CMP policy name. Should be existing and configured.</td>
</tr>
</tbody>
</table>

**Examples**

```
ap6522-D8273A(config-device-00-11-3F-D8-27-3A)#use crypto-cmp-policy CMP
ap6522-D8273A(config-device-00-11-3F-D8-27-3A)#commit
```
29.2.2 show

other-cmp-related-commands

Displays current status of CMP requests in progress. This command also displays trustpoint details (CMP and non-CMP trustpoints).

Supported in the following platforms:

- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

show crypto [cmp|pki]

show crypto cmp request status
show crypto pki trustpoints

Parameters

- show crypto cmp request status
- show crypto pki trustpoints

show crypto cmp request | Displays the current status of all on-going CMP requests

show crypto pki trustpoints | Displays all trustpoints including CMP generated trustpoints

Examples

ap6522-D8273A#show crypto pki trustpoints

<table>
<thead>
<tr>
<th>TRUSTPOINT</th>
<th>KEY NAME</th>
<th>VALID UNTIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>cmp-test</td>
<td>cmp-test-key</td>
<td>Fri May 9 09:44:22 2014 GMT</td>
</tr>
<tr>
<td>default-trustpoint</td>
<td>default_rsa_key</td>
<td>Fri Dec 30 00:00:40 2022 GMT</td>
</tr>
</tbody>
</table>

ap6522-D8273A#

ap6522-D8273A(config)#show crypto cmp request status

CMP Request Status: cmp-complete

ap6522-D8273A#
CHAPTER 30
ROAMING ASSIST POLICY

This chapter summarizes the Roaming Assist policy commands in the CLI command structure.

By constantly monitoring a client's packets and the received signal strength indicator (RSSI) of a given client by a group of access points, decision can be made on the optimal access point to which the client needs to roam. Then forcefully direct the client to the optimal access point.

The threshold intervals are configurable and can be adjusted based on the client load.

Use the (config) instance to configure a Roaming Assist policy. To navigate to the Roaming Assist policy configuration instance, use the following commands:

```
<DEVICE> (config) roaming-assist-policy <ROAMING-ASSIST-POLICY-NAME>
```

```
nx9500-6C8809(config)roaming-assist-policy test
```
```
nx9500-6C8809(config-roaming-assist-policy-test)#?
```

Roaming Assist Mode commands:

- `action` Configure action - action is deauth / log / assisted-roam
- `aggressiveness` Configure the roaming aggressiveness for a wireless client
- `detection-threshold` Configure the detection threshold - when exceeded, client monitoring starts
- `disassoc-time` Configure the disassociation time - time after which a disassociation is sent
- `handoff-count` Configure the handoff count - number of times client can exceed handoff threshold
- `handoff-threshold` Configure the handoff threshold - when exceeds an action is taken.
- `monitoring-interval` Configure the monitoring interval - interval at which client monitoring occurs
- `no` Negate a command or set its defaults
- `sampling-interval` Configure the sampling interval - interval at which client rssi values are checked
- `clrscr` Clears the display screen
- `commit` Commit all changes made in this session
- `end` End current mode and change to EXEC mode
- `exit` End current mode and down to previous mode
- `help` Description of the interactive help system
- `revert` Revert changes
- `service` Service Commands
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
nx9500-6C8809(config-roaming-assist-policy-test)#
```
NOTE: The input parameter `<HOSTNAME>`, wherever used in syntaxes across this chapter, cannot include an underscore (_) character. In other words, the name of a device cannot contain an underscore.
30.1 roaming-assist-policy-instance

ROAMING ASSIST POLICY

The following table summarizes roaming assist policy configuration mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>action</td>
<td>Specifies the action to be invoked on the client</td>
<td>page 30-4</td>
</tr>
<tr>
<td>aggressiveness</td>
<td>Configures a roaming aggressiveness value for wireless clients</td>
<td>page 30-5</td>
</tr>
<tr>
<td>detection-threshold</td>
<td>Configures the detection-threshold value</td>
<td>page 30-6</td>
</tr>
<tr>
<td>disassoc-time</td>
<td>Configures the disassociation interval</td>
<td>page 30-7</td>
</tr>
<tr>
<td>handoff-count</td>
<td>Configures the handoff-count value</td>
<td>page 30-8</td>
</tr>
<tr>
<td>handoff-threshold</td>
<td>Configures the handoff-threshold value</td>
<td>page 30-9</td>
</tr>
<tr>
<td>monitoring-interval</td>
<td>Configures the client monitoring interval</td>
<td>page 30-10</td>
</tr>
<tr>
<td>sampling-interval</td>
<td>Configures the interval at which clients are sampled to determine their RSSI value</td>
<td>page 30-11</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts this roaming assist policy settings based on the parameters passed</td>
<td>page 30-12</td>
</tr>
</tbody>
</table>

NOTE: For more information on common commands (clrscr, commit, help, revert, service, show, write, and exit), see Chapter 5, COMMON COMMANDS.
### 30.1.1 action

*roaming-assist-policy-instance*

Specifies the action invoked on the client once it reaches a specified threshold value. The threshold values are configured based on the client load.

Supported in the following platforms:

- **Access Points** — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

`action [assisted-roam|deauth|log]`

**Parameters**

- **action [assisted-roam|deauth|log]**

| action [assisted-roam|deauth|log] | Configures the action invoked on the client once it reaches the specified threshold value. The options are:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• assisted-roam – Provides 802.11v assisted roaming facility to the client</td>
<td></td>
</tr>
<tr>
<td>• deauth – De-authenticates the client. This is the default setting.</td>
<td></td>
</tr>
<tr>
<td>• log – Generates a log</td>
<td></td>
</tr>
<tr>
<td>In all three cases an event is generated. However, the message generated differs and is based on the action specified.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

`rfs6000-81742D(config-roaming-assist-policy-test)#action log`

`rfs6000-81742D(config-roaming-assist-policy-test)#`

**Related Commands**

- **no** Removes the configured action details
30.1.2 aggressiveness

Configures a roaming aggressiveness value for wireless clients. Configuring this value increases the client's roaming capabilities in scenarios where the client's location is likely to change drastically and suddenly. For example, when a client hops on to a train that speeds up quickly. In such a scenario, the access point receives a maximum of 2 (two) messages, from the client, having relatively low RSSI value. This results in a decaying-average, which is above the specified handover-threshold value. Consequently, the client is unable to roam.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

aggressiveness [highest|lowest|medium|medium-high|medium-low]

Parameters

- aggressiveness [highest|lowest|medium|medium-high|medium-low]

Examples

nx9500-6C8809(config-roaming-assist-policy-test)#aggressiveness medium
nx9500-6C8809(config-roaming-assist-policy-test)#show context roaming-assist-policy test aggressiveness medium

Related Commands

- no | Reverts the aggressiveness value to default (lowest)
30.1.3 detection-threshold

roaming-assist-policy-instance

Specifies the detection-threshold determining when a client is monitored.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

detection-threshold <-100--40>

Parameters

- detection-threshold <-100--40>

<table>
<thead>
<tr>
<th>detection-threshold &lt;-100--40&gt;</th>
<th>Configures the detection threshold value determining when a client is monitored. The clients with bad RSSI values are monitored more frequently.</th>
</tr>
</thead>
<tbody>
<tr>
<td>-100--40&gt;</td>
<td>-100--40&gt; – Specify the RSSI value from -100 dBm to -40 dBm. The default is -75 dBm.</td>
</tr>
</tbody>
</table>

Examples

rfs6000-81742D(config-roaming-assist-policy-test)#detection-threshold -90
rfs6000-81742D(config-roaming-assist-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>no</th>
<th>Removes the configured detection threshold details</th>
</tr>
</thead>
</table>
30.1.4 disassoc-time

roaming-assist-policy-instance

Configures the disassociation time. This is the time period after which a disassociation message is sent.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

disassoc-time <1-10>

Parameters
- disassoc-time <1-10>

<table>
<thead>
<tr>
<th>disassoc-time &lt;1-10&gt;</th>
<th>Configures the disassociation time in seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-10&gt;</td>
<td>&lt;1-10&gt; – Specify a value from 1 - 10 seconds. The default is 5 seconds.</td>
</tr>
</tbody>
</table>

Examples

nx9500-6C8809(config-roaming-assist-policy-test)#disassoc-time 7

nx9500-6C8809(config-roaming-assist-policy-test)#show context roaming-assist-policy test disassoc-time 7

nx9500-6C8809(config-roaming-assist-policy-test)#

Related Commands

no Removes the configured disassociation time
30.1.5 **handoff-count**

Specifies the number of times a client can exceed the specified handoff-threshold value before an action is invoked.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

```
handoff-count <1-10>
```

**Parameters**

- `handoff-count <1-10>`

<table>
<thead>
<tr>
<th>handoff-count &lt;1-10&gt;</th>
<th>Specifies the number of times a client can exceed the specified handoff-threshold value before an action is invoked</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>• &lt;1-10&gt; — Specify a value from 1 - 10. The default is 3. If the client's RSSI increases beyond the set handoff-threshold, it is removed from the queue for monitoring and action invocation.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs6000-81742D(config-roaming-assist-policy-test)#handoff-count 1
rfs6000-81742D(config-roaming-assist-policy-test)#
```

**Related Commands**

- `no` Removes the configured handoff-count details
### 30.1.6 handoff-threshold

*roaming-assist-policy-instance*

Configures the handoff-threshold, which specifies client status for handoff-action. Once exceeded an action is invoked.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

**Syntax**

handoff-threshold <-100--40>

**Parameters**

- handoff-threshold <-100--40>

<table>
<thead>
<tr>
<th>handoff-threshold &lt;-100--40&gt;</th>
<th>Configures the handoff-threshold, which specifies client status for handoff-action. Once exceeded an action is invoked.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;-100--40&gt; – Specify the RSSI value from -100 dBm - -40 dBm. The default is -80 dBm. If the client's RSSI increases beyond the set handoff-threshold, it is removed from the queue for monitoring and action invocation.</td>
</tr>
</tbody>
</table>

**Examples**

rfs6000-81742D(config-roaming-assist-policy-test)#handoff-threshold -78  
rfs6000-81742D(config-roaming-assist-policy-test)#

**Related Commands**

| no | Removes the configured handoff-threshold details |
30.1.7 monitoring-interval

roaming-assist-policy-instance

Configures the interval, in seconds, at which clients are monitored to determine if their RSSI value is below the specified handoff-threshold value.

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

monitoring-interval <1-60>

Parameters

- monitoring-interval <1-60>

| monitoring interval <1-60> | Specifies the interval, in seconds, at which clients are monitored to determine if their RSSI is below the specified handoff-threshold
|                           | • <1-60> – Specify the duration from 1 - 60 seconds. The default is 5 seconds.

Examples

rfs6000-81742D(config-roaming-assist-policy-test)#monitoring-interval 10
rfs6000-81742D(config-roaming-assist-policy-test)#

Related Commands

- no
  Removes the configured monitoring interval details
30.1.8 sampling-interval

roaming-assist-policy-instance

Configures the interval, in seconds, at which clients are sampled to determine their RSSI value.

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

sampling-interval <5-60>

Parameters

- sampling-interval <5-60>

<table>
<thead>
<tr>
<th>sampling-interval &lt;5-60&gt;</th>
<th>Configures the interval, in seconds, between two successive client samplings.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;5-60&gt; – Specify a value from 5 - 60 seconds. The default value is 15 seconds.</td>
</tr>
<tr>
<td>Note:</td>
<td>Higher the RSSI value, stronger is the signal.</td>
</tr>
</tbody>
</table>

Examples

rfs6000-81742D(config-roaming-assist-policy-test)#sampling-interval 20

rfs6000-81742D(config-roaming-assist-policy-test)#

Related Commands

- no
  REMOVE THE CONFIGURED SAMPLING INTERVAL DETAILS
30.1.9 no

roaming-assist-policy-instance

Removes or reverts this roaming assist policy settings based on the parameters passed

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP7502, AP7522, AP7532, AP7562, AP81XX, AP82XX, AP8432, AP8533
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5500, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510, NX9600

Syntax

no [action|aggressiveness|detection-threshold|disassoc-time|handoff-count|handoff-threshold|monitoring-interval|sampling-interval]

Parameters

- no <PARAMETERS>

| no <PARAMETERS> | Removes or reverts this roaming assist policy settings to default based on the parameters passed |

Examples

rfs6000-81742D(config-roaming-assist-policy-test)#no action
rfs6000-81742D(config-roaming-assist-policy-test)#no detection-threshold
rfs6000-81742D(config-roaming-assist-policy-test)#no handoff-threshold
rfs6000-81742D(config-roaming-assist-policy-test)#show context
roaming-assist-policy test
  sampling-interval 20
  monitoring-interval 10
rfs6000-81742D(config-roaming-assist-policy-test)#
APPENDIX A
CONTROLLER MANAGED WLAN USE CASE

This section describes the activities required to configure a WLAN. Instructions are provided using the wireless controller CLI.

- Creating a First Controller Managed WLAN
- Assumptions
- Design
- Using the Command Line Interface to Configure the WLAN
A.1 Creating a First Controller Managed WLAN

CONTROLLER MANAGED WLAN USE CASE
This section describes the process of creating managed WLAN on an RFS4000 wireless controller.
Upon completion, you will have created a WLAN on a RFS4000 model wireless controller using a DHCP server to allocate IP addresses to associated wireless clients.

A.1.1 Assumptions
Verify the following conditions have been satisfied before attempting the WLAN configuration activities described in this section:

- It is assumed the RFS4000 wireless controller has the latest firmware version available.
- It is assumed the AP650 and AP71XX access points also have the latest firmware version available.
- It is assumed there are no previous configurations on the wireless controller or access point and default factory configurations are running on the devices.
- It is assumed you have administrative access to the wireless controller and access point CLI.
- It is assumed the individual administrating the network is a professional network installer.

A.1.2 Design
This section defines the network design being implemented.

Figure A-1  Network Design
This is a simple deployment scenario, with the access points connected directly to the wireless controller. One wireless controller port is connected to an external network.
On the RFS4000 wireless controller, the GE1 interface is connected to an external network. Interfaces GE3 and GE4 are used by the access points.
On the external network, the wireless controller is assigned an IP address of 192.168.10.188. The wireless controller acts as a DHCP server for the wireless clients connecting to it, and assigns IP addresses in the range of 172.16.11.11 to 172.16.11.200. The rest of IPs in the range are reserved for devices requiring static IP addresses.
A.1.3 Using the Command Line Interface to Configure the WLAN

Creating a First Controller Managed WLAN

These instructions are for configuring your first WLAN using the wireless controller CLI.

Use a serial console cable when connecting to the wireless controller for the first time. Set the following configuration when using the serial connection:

- Bits per second: 19200
- Data Bit: 8
- Parity: None
- Stop Bit: 1
- Flow Control: None

The steps involved in creating a WLAN on a wireless controller are:

1. Logging Into the Controller for the First Time
2. Creating a RF Domain
3. Creating a Wireless Controller Profile
4. Creating an AP Profile
5. Creating a DHCP Server Policy
6. Completing and Testing the Configuration

A.1.3.1 Logging Into the Controller for the First Time

Using the Command Line Interface to Configure the WLAN

When powering on the wireless controller for the first time, you are prompted to replace the existing administrative password. The credentials for logging into the wireless controller for the first time are:

- User Name: admin
- Password: admin123

Ensure the new password created is strong enough to provide adequate security for the wireless controller managed network.

A.1.3.2 Creating a RF Domain

Using the Command Line Interface to Configure the WLAN

A RF Domain is a collection of configuration settings specific to devices located at the same physical deployment, such as a building or a floor. Create a RF Domain and assign the country code where the devices are deployed. This is a mandatory step, and the devices will not function as intended if this step is omitted.

The instructions in this section must be performed from the Global Configuration mode of the wireless controller. To navigate to this mode:

rfs4000>enable
rfs4000#
rfs4000#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
rfs4000(config)#
Create the RF Domain using the following commands:

```bash
rfs4000(config)#rf-domain RFDOMAIN_UseCase1
rfs4000(config-rf-domain-RFDOMAIN_UseCase1)#
```

This command creates a profile with the name `RFDOMAIN_UseCase1`.

Set the country code for the RF Domain.

```bash
rfs4000(config-rf-domain-RFDOMAIN_UseCase1)#country-code us
```

This sets the country code for this RF Domain. Save this change and exit the RF Domain profile context.

```bash
rfs4000(config-rf-domain-RFDOMAIN_UseCase1)#commit write
rfs4000(config-rf-domain-RFDOMAIN_UseCase1)#exit
```

To define the wireless controller’s physical location, use the same RF Domain configuration.

```bash
rfs4000(config)#self
rfs4000(config-device-03-14-28-57-14-28)#
rfs4000(config-device-03-14-28-57-14-28)#use rf-domain RFDOMAIN_UseCase1
```

Commit the changes and write to the running configuration. Exit this context.

```bash
rfs4000(config-device-03-14-28-57-14-28)#commit write
rfs4000(config-device-03-14-28-57-14-28)#exit
```

```bash
rfs4000(config)#
```

### A.1.3.3 Creating a Wireless Controller Profile

**Using the Command Line Interface to Configure the WLAN**

The first step in creating a WLAN is to configure a profile defining the parameters applied to a wireless controller.

To create a profile:

```bash
rfs4000(config)#profile rfs4000 RFS4000_UseCase1
rfs4000(config-profile-RFS4000_UseCase1)#
```

This creates a profile with the name `RFS4000_UseCase1` and moves the cursor into its context. Any configuration made under this profile is available when it is applied to a device.

**Configure a VLAN**

Create the VLAN to use with the WLAN configuration. This can be done using the following commands:

```bash
rfs4000(config-profile-RFS4000_UseCase1)#interface vlan 2
rfs4000(config-profile-RFS4000_UseCase1-if-vlan2)#ip address 172.16.11.1/24
```

The above command assigns the IP address 172.16.11.1 with the mask of 255.255.255.0 to VLAN 2. Exit the VLAN 2 context.

```bash
rfs4000(config-profile-RFS4000_UseCase1-if-vlan2)#exit
rfs4000(config-profile-RFS4000_UseCase1)#
```

The next step is to assign this newly created VLAN to a physical interface. In this case, VLAN 2 is mapped to GE3 and GE4 to support two access points, an AP650 and an AP71XX. The AP650 is connected to the gigabit interface GE3 and the AP71XX to the GE4 interface.

```bash
rfs4000(config-profile-RFS4000_UseCase1)#interface ge 3
rfs4000(config-profile-RFS4000_UseCase1-if-ge3)#
```

Map VLAN 2 to this interface. This assigns the IP address to the selected physical interface.

```bash
rfs4000(config-profile-RFS4000_UseCase1-if-ge3)#switchport access vlan 2
rfs4000(config-profile-RFS4000_UseCase1-if-ge3)#exit
rfs4000(config-profile-RFS4000_UseCase1)#
```

Similarly, map the defined VLAN 2 to the GE4 interface.

```bash
rfs4000(config-profile-RFS4000_UseCase1)#interface ge 4
rfs4000(config-profile-RFS4000_UseCase1-if-ge4)#switchport access vlan 2
rfs4000(config-profile-RFS4000_UseCase1-if-ge4)#exit
rfs4000(config-profile-RFS4000_UseCase1)#
```

Exit the profile and save it.

```bash
rfs4000(config-profile-RFS4000_UseCase1)#exit
rfs4000(config)#commit write
```
Configure the Wireless Controller to use the Profile

Before the wireless controller can be further configured, the profile must be applied to the wireless controller.

```plaintext
rfs4000(config)#self
rfs4000(config-device-03-14-28-57-14-28)#
```
rfs4000(config-device-03-14-28-57-14-28)#use profile RFS4000_UseCase1
rfs4000(config-device-03-14-28-57-14-28)#exit
rfs4000(config)#commit write
```

Create a WLAN

Use the following commands to create a WLAN:

```plaintext
rfs4000(config)#wlan 1
rfs4000(config-wlan-1)#
```
Configure the SSID for the WLAN. This is the value that identifies and helps differentiate this WLAN.

```plaintext
rfs4000(config-wlan-1)#ssid WLAN_USECASE_01
```
Enable the SSID to be broadcast so wireless clients can find it and associate.

```plaintext
rfs4000(config-wlan-1)#broadcast-ssid
```
Associate VLAN 2 to the WLAN and exit.

```plaintext
rfs4000(config-wlan-1)#vlan 2
rfs4000(config-wlan-1)#exit
```

Commit the Changes

Once these changes have been made, they have to be committed before proceeding.

```plaintext
rfs4000(config)#commit write
```

A.1.3.4 Creating an AP Profile

Using the Command Line Interface to Configure the WLAN

An AP profile provides a method of applying common settings to access points of the same model. The profile significantly reduces the time required to configure access points within a large deployment. For more information, see:

- Creating an AP650 Profile
- Creating an AP71XX Profile

A.1.3.4.1 Creating an AP650 Profile

Creating an AP Profile

An AP650’s firmware is updated directly by its associated wireless controller. The process is automatic, and no intervention is required. To create a profile for use with an AP650:

```plaintext
rfs4000(config)#profile ap650 AP650_UseCase1
rfs4000(config-profile-AP650_UseCase1)#
```
Assign the access point to be a member of the same VLAN defined in Creating an AP Profile on page A-5. In this section, the VLAN was defined as VLAN 2. Configure the access point to be a member of VLAN 2.

```plaintext
rfs4000(config-profile-AP650_UseCase1)#interface vlan 2
rfs4000(config-profile-AP650_UseCase1-if-vlan2)#
```
Configure this VLAN to use DHCP, so any device that is associated using this access point is automatically assigned a unique IP address. Once completed, exit this context.

```plaintext
rfs4000(config-profile-AP650_UseCase1-if-vlan2)#ip address dhcp
rfs4000(config-profile-AP650_UseCase1-if-vlan2)#exit
```
The VLAN has to be mapped to a physical interface on the access point. Since the only available physical interface on the AP650 is GE1, this VLAN is mapped to it.

```plaintext
rfs4000(config-profile-AP650_UseCase1)#interface ge 1
rfs4000(config-profile-AP650_UseCase1-if-ge1)#switchport access vlan 2
rfs4000(config-profile-AP650_UseCase1-if-ge1)#exit
```
Before a WLAN can be implemented, it has to be mapped to a radio on the access point. An AP650 has 2 radios, in this scenario, both radios are utilized.
To create a profile for use with an AP71XX:

```
> rfs4000(config)#profile ap7131 AP7131_UseCase1
> rfs4000(config-profile-AP7131_UseCase1)#
```

Set the access point to be a member of the same VLAN defined in "Creating an AP Profile on page A-5." In this section, the VLAN was defined as VLAN 2. Configure the access point to be a member of the VLAN 2.

```
> rfs4000(config-profile-AP7131_UseCase1)#interface vlan 2
> rfs4000(config-profile-AP7131_UseCase1-if-vlan2)#
```

Configure this VLAN to use DHCP, so any device associated using this access point is automatically assigned a unique IP address. Once completed, exit this context.

```
> rfs4000(config-profile-AP7131_UseCase1-if-vlan2)#ip address dhcp
> rfs4000(config-profile-AP7131_UseCase1-if-vlan2)#exit
```

The configured VLAN has to be mapped to a physical interface on the access point. Map VLAN 2 to the GE1 and GE2 interfaces on the AP71XX. To configure the GE1 interface:

```
> rfs4000(config-profile-AP7131_UseCase1)#interface ge 1
> rfs4000(config-profile-AP7131_UseCase1-if-ge1)#switchport access vlan 2
> rfs4000(config-profile-AP7131_UseCase1-if-ge1)#exit
```

Similarly configure the GE2 interface.

```
> rfs4000(config-profile-AP7131_UseCase1)#interface ge 2
> rfs4000(config-profile-AP7131_UseCase1-if-ge2)#switchport access vlan 2
> rfs4000(config-profile-AP7131_UseCase1-if-ge2)#exit
```

Before the WLAN can be implemented, it has to be mapped to the physical radio on the access point. An AP71XX has 3 radios (on certain models), two of which can be configured for WLAN support. In this scenario, two radios are used.

```
> rfs4000(config-profile-AP7131_UseCase1)#interface radio 1
> rfs4000(config-profile-AP7131_UseCase1-if-radio1)#wlan 1
```
A.1.3.5 Creating a DHCP Server Policy

Using the Command Line Interface to Configure the WLAN

The DHCP server policy defines the parameters required to run a DHCP server on the wireless controller and assign IP addresses automatically to devices that associate. Configuring DHCP enables the reuse of a limited set of IP addresses.

To create a DHCP server policy:

```
rfs4000-37FABE(config)#dhcp-server-policy DHCP_POLICY_UseCase1
rfs4000-37FABE(config-dhcp-policy-DHCP_POLICY_UseCase1)#
```

The following table displays how IP addresses are used.

<table>
<thead>
<tr>
<th>IP Range</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.16.11.1 till 172.16.11.10</td>
<td>Reserved for devices that require a static IP address</td>
</tr>
<tr>
<td>172.16.11.11 till 172.16.11.200</td>
<td>Range of IP addresses that can be assigned using the DHCP server.</td>
</tr>
<tr>
<td>172.16.11.201 till 172.16.11.254</td>
<td>Reserved for devices that require a static IP address</td>
</tr>
</tbody>
</table>

In the table, the IP address range of 172.16.11.1 to 172.16.11.200 is available using the DHCP server. To configure the DHCP server:

```
rfs4000-37FABE(config-dhcp-policy-DHCP_POLICY_UseCase1)#dhcp-pool DHCP_POOL_USECASE1_01
rfs4000-37FABE(config-dhcp-policy-DHCP_POLICY_UseCase1-pool-DHCP_POOL_USECASE1_01)#
```

Configure the address range as follows:

```
rfs4000-37FABE(config-dhcp-policy-DHCP_POLICY_UseCase1-pool-DHCP_POOL_USECASE1_01)#address range 172.16.11.11 172.16.11.200
rfs4000-37FABE(config-dhcp-policy-DHCP_POLICY_UseCase1-pool-DHCP_POOL_USECASE1_01)#
```

Configure the IP pool used with a network segment. This starts the DHCP server on the specified interface.
rfs4000-37FABE(config-dhcp-policy-DHCP_POLICY_UseCase1-pool-DHCP_POOL_USECASE1_01)#network 172.16.11.0/24
rfs4000-37FABE(config-dhcp-policy-DHCP_POLICY_UseCase1-pool-DHCP_POOL_USECASE1_01)#exit
rfs4000-37FABE(config-dhcp-policy-DHCP_POLICY_UseCase1)#exit
rfs4000-37FABE(config)#commit write

Configure the RFS4000 to use the DHCP Policy

For the DHCP to work properly, the new DHCP Server Policy must be applied to the wireless controller. To apply the DHCP Server Policy to the wireless controller:

rfs4000-37FABE(config)#self
rfs4000-37FABE(config-device-03-14-28-57-14-28)#use dhcp-server-policy DHCP_POLICY_UseCase1
rfs4000-37FABE(config-device-03-14-28-57-14-28)#commit write
rfs4000-37FABE(config-device-03-14-28-57-14-28)#exit
rfs4000-37FABE(config)#

A.1.3.6 Completing and Testing the Configuration

Using the Command Line Interface to Configure the WLAN

A wireless client must be configured to associate with the wireless controller managed WLAN. The following information must be defined:

- SSID: WLAN_USECASE_01
- Country: Same as the country configured in Creating a RF Domain on page A-3. In this scenario, the country code is set to US.
- Mode: Infrastructure

With the WLAN set to beacon, use the wireless client's discovery client to discover the configured WLAN and associate.
B.1 General Information

This document contains information regarding licenses, acknowledgments and required copyright notices for open source packages used in the following products:

**Access Points**
- AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP7131, AP7161, AP7181, AP7502, AP7522, AP7532, AP7533, AP8122, AP8132, AP8222, AP8232, AP8432, and AP8533.

**Wireless Controllers and Service Platforms**
- NX9510, NX9500, NX9000, NX7500, NX7510, NX7520, NX7530, NX6524, NX6500, NX4524, NX5500, RFS7000, RFS6000, RFS4000 and RFS4011.
B.2 Open Source Software Used

The Support site, located at www.zebra.com/support provides information and online assistance including developer tools, software downloads, product manuals, support contact information and online repair requests.

<table>
<thead>
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<th>Name</th>
<th>Version</th>
<th>URL</th>
<th>License</th>
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<tr>
<td>Apache Web Server</td>
<td>1.3.41</td>
<td><a href="http://www.apache.org/">http://www.apache.org/</a></td>
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</tr>
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<td>Asterisk</td>
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<td>GNU General Public License 2.0</td>
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<td>MIT License</td>
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<td>advas</td>
<td>0.2.3</td>
<td><a href="http://advas.sourceforge.net/">http://advas.sourceforge.net/</a></td>
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<td>alivepdf</td>
<td>0.1.4.9</td>
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<td>autoconf</td>
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<td>bluez</td>
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<td>MIT License</td>
</tr>
<tr>
<td>bridge</td>
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<td><a href="http://www.linuxfoundation.org/collaborate/workgroups/networking/bridge/">http://www.linuxfoundation.org/collaborate/workgroups/networking/bridge/</a></td>
<td>GNU General Public License, version 2</td>
</tr>
<tr>
<td>bridge-utils</td>
<td>1.0.4</td>
<td><a href="http://sourceforge.net/projects/bridge/">http://sourceforge.net/projects/bridge/</a></td>
<td>GNU General Public License, version 2</td>
</tr>
<tr>
<td>buffer-crc32</td>
<td>0.2.5</td>
<td><a href="http://registry.npmjs.org/buffer-crc32/-/buffer-crc32-0.2.5.tgz">http://registry.npmjs.org/buffer-crc32/-/buffer-crc32-0.2.5.tgz</a></td>
<td>MIT License</td>
</tr>
<tr>
<td>Name</td>
<td>Version</td>
<td>URL</td>
<td>License</td>
</tr>
<tr>
<td>---------------</td>
<td>---------</td>
<td>------------------------------------------</td>
<td>--------------------------------------------------------------</td>
</tr>
<tr>
<td>busybox</td>
<td>1.14.4</td>
<td><a href="http://www.busybox.net/">http://www.busybox.net/</a></td>
<td>GNU General Public License, version 2</td>
</tr>
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This license, the Library General Public License, applies to some specially designated Free Software Foundation software, and to any other libraries whose authors decide to use it. You can use it for your libraries, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, thus in effect making the program proprietary software. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License, which was designed for utility programs. This license, the GNU Library General Public License, applies to certain designated libraries. This license is quite different from the ordinary one; be sure to read it in full, and don't assume that anything in it is the same as in the ordinary license.

The reason we have a separate public license for some libraries is that they blur the distinction we usually make between modifying or adding to a program and simply using it. Linking a program with a library, without changing the library, is in some sense simply using the library, and is analogous to running a utility program or application program. However, in a textual and legal sense, the linked executable is a combined work, a derivative of the original library, and the ordinary General Public License treats it as such.

Because of this blurred distinction, using the ordinary General Public License for libraries did not effectively promote software sharing, because most developers did not use the libraries. We concluded that weaker conditions might promote sharing better.
However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while preserving your freedom as a user of such programs to change the free libraries that are incorporated in them. (We have not seen how to achieve this as regards changes in header files, but we have achieved it as regards changes in the actual functions of the Library.) The hope is that this will lead to faster development of free libraries.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, while the latter only works together with the library.

Note that it is possible for a library to be covered by the ordinary General Public License rather than by this special one.

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0. This License Agreement applies to any software library which contains notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Library General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification").

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the

   You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:
   a. The modified work must itself be a software library.
   b. You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
   c. You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
d. If a facility in the modified Library refers to a function or a table of data to be supplied by an
application program that uses the facility, other than as an argument passed when the facility is
invoked, then you must make a good faith effort to ensure that, in the event an application does
not supply such function or table, the facility still operates, and performs whatever part of its
purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-
defined independent of the application. Therefore, Subsection 2d requires that any application-
supplied function or table used by this function must be optional: if the application does not supply
it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are
not derived from the Library, and can be reasonably considered independent and separate works in
themselves, then this License, and its terms, do not apply to those sections when you distribute them
as separate works. But when you distribute the same sections as part of a whole which is a work
based on the Library, the distribution of the whole must be on the terms of this License, whose
permissions for other licensees extend to the entire whole, and thus to each and every part
regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by
you; rather, the intent is to exercise the right to control the distribution of derivative or collective works
based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work
based on the Library) on a volume of a storage or distribution medium does not bring the other work
under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License
to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so
that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If
a newer version than version 2 of the ordinary GNU General Public License has appeared, then you
can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General
Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not
a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object
code or executable form under the terms of Sections 1 and 2 above provided that you accompany it
with the complete corresponding machine-readable source code, which must be distributed under the
terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering
equivalent access to copy the source code from the same place satisfies the requirement to distribute
the source code, even though third parties are not compelled to copy the source along with the object
code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the
Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in
isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a
derivative of the Library (because it contains portions of the Library), rather than a "work that uses
the library". The executable is therefore covered by this License. Section 6 states terms for
distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the
object code for the work may be a derivative work of the Library even though the source code is not.
Whether this is true is especially significant if the work can be linked without the Library, or if the work
is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small
macros and small inline functions (ten lines or less in length), then the use of the object file is
unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object
code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work
under the terms of Section 6. Any executables containing that work also fall under Section 6, whether
or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library"
with the Library to produce a work containing portions of the Library, and distribute that work under
terms of your choice, provided that the terms permit modification of the work for the customer's own
use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the
Library and its use are covered by this License. You must supply a copy of this License. If the work
during execution displays copyright notices, you must include the copyright notice for the Library
among them, as well as a reference directing the user to the copy of this License. Also, you must do
one of these things:

a. Accompany the work with the complete corresponding machine-readable source code for the
Library including whatever changes were used in the work (which must be distributed under
Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the
complete machine-readable "work that uses the Library", as object code and/or source code, so
that the user can modify the Library and then relink to produce a modified executable containing
the modified Library. (It is understood that the user who changes the contents of definitions files
in the Library will not necessarily be able to recompile the application to use the modified
definitions.)

b. Accompany the work with a written offer, valid for at least three years, to give the same user the
materials specified in Subsection 6a, above, for a charge no more than the cost of performing this
distribution.

c. If distribution of the work is made by offering access to copy from a designated place, offer
equivalent access to copy the above specified materials from the same place.

d. Verify that the user has already received a copy of these materials or that you have already sent
this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and
utility programs needed for reproducing the executable from it. However, as a special exception, the
materials to be distributed need not include anything that is normally distributed (in either source or
binary form) with the major components (compiler, kernel, and so on) of the operating system on
which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries
that do not normally accompany the operating system. Such a contradiction means you cannot use
both them and the Library together in an executable that you distribute.
7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

   a. Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

   b. Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

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Version 2, June 1991

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[This is the first released version of the library GPL. It is numbered 2 because it goes with version 2 of the ordinary GPL.]

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Also, for each distributor's protection, we want to make certain that everyone understands that there is no warranty for this free library. If the library is modified by someone else and passed on, we want its recipients to know that what they have is not the original version, so that any problems introduced by others will not reflect on the original authors' reputations.

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   * b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
   * c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
   * d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

   (For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

   These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

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3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

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   This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

   If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.
5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License. However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also compile or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

* a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

* b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

* c) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

* d) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.
It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

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